

MIMI AND FRIENDS' BIG EARTH ADVENTURE



Story by Toby Shannon-Smith

Illustrated by Pauline Gregory

For Jack, the greatest co-adventurer
a brother could ask for.

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About the Author

Toby Shannon-Smith works at the Institute of Physics and lives in West London with his husband and two noisy cats called Appa and Momo. He has got a degree in physics and a Master's in Science Communication and this is his fourth book, along with the others in the *Mimi's Adventures* series. When he's not writing books, you'll probably find him painting, knitting, sewing or cooking.

About the Illustrator

Pauline Gregory is a children's illustrator living on the Cornish coast. Following her passion, Pauline graduated from Arts University Plymouth with a First Class Honours BA in illustration. She takes inspiration from the funny and endearing things that animals and people do everyday and the superb imagination that children have.

Pauline works with traditional materials to create quirky illustrations with humour and charm.

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With Thanks To

Imogen Thompson, Mikey Jarrell and Louise Swan

Welcome Parents, Carers and Teachers!

*(And if you're a young person reading by yourself,
the fun bit starts on the next page!)*

Welcome to the latest in the *Mimi's Adventure* series from the Institute of Physics! We want to make sure that all young people can access the opportunities that doing STEM (Science, Technology, Engineering and Maths) subjects can bring, and physics in particular. It opens doors to stable jobs in in-demand industries, research, healthcare and many more. Doing physics also supports young people to work directly on the global challenges that they care about, like the impacts of climate change.

Whether it's creating new ways to generate and store sustainable electricity, researching the impacts of climate change on our oceans or protecting vital infrastructure that we all rely on, physics is creating some of the most powerful tools to protect our world and the people that live here.

Living in an ever-changing world, young people have a range of complicated feelings about climate change.

It's important to be honest about the problem, as well as about what we can all do about it. Alongside encouraging young people to make eco-friendly everyday choices, one of the most important things that you can do is to encourage them to explore their options in education and their future careers. By doing subjects like physics, they can have the chance to work on solutions to these problems when they're older. Doing physics at school and beyond can also give their learning a sense of purpose along the way, to help them navigate their feelings about the climate crisis.

In the meantime, we hope that you enjoy this adventure around planet Earth! For more fun things to read and do together with your young people either at home or in the classroom, please visit [***iop.org/big-earth-adventure***](https://iop.org/big-earth-adventure)

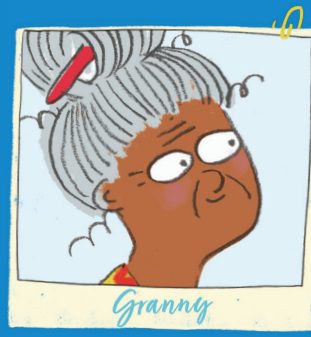
And don't forget to have a look at the profiles of some amazing real-life scientists after the story has finished!

Meet our Heroes!



Mimi

Mimi is a little girl with a lot of big questions. She is fascinated by everything around her and always wants to know HOW and WHY!



Granny

Mimi's **Granny** is an artist and an inventor. She's always got a project on the go and creating something new.



Colin

Colin is Mimi and Granny's best friend. He may not always know what is going on but he always wants to get involved!



Dave

Dave is Granny's greatest invention – he's a robot that loves to help people!

Meet Mimi's Friends!



Maryam

Maryam loves to build things. Whether it's building a marble roller coaster or attempting to super-charge their remote-controlled car.



Gracie

Gracie is a gamer. She loves a challenge and an opportunity to work with their friends to beat a computer game and play sports.



Pip

Pip loves to solve a puzzle. His favourite is a puzzle cube, but any kind of brainteaser is going to make him happy.



Eoin

Eoin is an explorer. He loves discovering a new place; whether that's outside in nature, in a museum or at a theme park.



The garden was almost completely silent. The wind ruffled the leaves on the apple tree and there was the gentle swoosh of traffic on the road. The clothesline went creeeeeeeek as Granny's washing waved in the breeze.

Walking on tiptoes in an attempt to avoid making noise on the gravel path, Mimi crept to the side door of the garage, knocked on it several times before easing it open and she slipped in. There were muffled voices inside that quickly went quiet until the door closed again with a click.

Mimi had pinned a sign on the garage door and in her best handwriting she had written:

***"SECRET PLANS IN PROGRESS!
NO UNAUTHORISED ACCESS!"***

It looks like Mimi's got a secret!



Chapter 1 – Did-You-Know?

Normally, Granny's garage was full of half-built inventions, her latest artworks and the usual rubbish that finds its way into dark corners. For now, Mimi had cleared some space in the middle and taken it over for her very own project...

Mimi perched on the edge of a wooden crate and looked around. Sitting on an array of different bits of furniture were her friends from school. They had bonded over a shared love of too-strange-to-be-true, amazing facts, spending their breaktimes huddled over a tattered copy of *Believe it or don't! Weird and wonderful stuff to baffle your friends and family!*



They loved sharing the latest new thing they'd read in the book with each other – always starting with a breathless “Did-You-Know?”

“Did you know a group of cats is called a ‘pounce’?”

“Did you know that the human body is more than half water?”

“Did you know that there used to be Olympic medals for writing poems?”

So, they called themselves the “Did-You-Know Club”.

The only problem was they had read the book from cover to cover so many times, they had all memorised every page. So, they had decided to find out brand new stuff and then get together to share what they had found. A secret project!

Mimi found a little hammer from Granny's tool rack and tapped it on the side of the crate.

"Order, order! Welcome to the first meeting of the Did-You-Know Club!"

But before she could actually get started, the door banged open and they all jumped.

"Grannyyyyy!" scolded Mimi, pretending to be cross. "What's the point of a secret knock if you don't use it?!"

"Sorry, sorry!" said Granny, turning around, walking out and closing the door behind her. She banged out a complicated rhythm on the door and then came back in again. Following her in came Dave, her robot, and Colin the dog who bounded in, stuck his head in a cardboard box and brought out a stick that he immediately started chewing on loudly.

"I'm not here, I'm not here!" said Granny, rummaging on her workbench.

"As I was saying..." said Mimi over the clattering of tools in the background and Colin's enthusiastic chewing.

"Woof?" said Colin.

"Beep" said Dave.

"AS I WAS SAYING..." said Mimi, even more loudly, stopping as Granny accidentally dropped an armful of bits of metal on the garage floor, making a massive **CLANG**. Mimi sighed.

"Granny, Colin, Dave: Would you like to join us?" Mimi asked. Granny nodded excitedly and they made room for her on the boxes that they were using as seats. Dave trundled over on his wheel and Colin bounded over to Mimi, dragging his stick behind him, and sat down on her feet.



“Ahem. As I was saying: Welcome to the first meeting of the Did-You-Know Club!” said Mimi as everyone in the circle cheered, excited to get started at last! “The Did-You-Know Club is a place for us to get together to share amazing facts so I hope everyone has brought something with them? And, as we know, we’ve decided to kick off with facts about Planet Earth!”

Everyone around the circle nodded enthusiastically.

“Ok, let’s get going!” she said, relieved to be making a start at last!



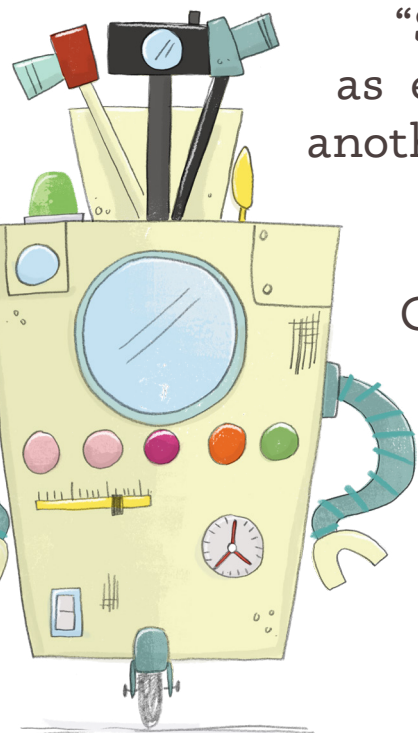
CHAPTER TWO



Chapter 2 – Wait a Second...

“Oh!” said Granny. “Before we do... Let me show you all a brand-new invention... Dave, go ahead!”

Mimi sighed impatiently as Dave trundled into the middle of the circle and opened a hatch on the top of his head. A cluster of complicated-looking camera lenses and other scientific looking things popped out and slowly started to turn.



“Scanning in progress!” said Dave, importantly, as everyone else in the room looked at one another nervously.

“Granny, what’s going on?” asked Mimi but Granny shushed her, bouncing up and down on her seat excitedly.

Laser beams shone out of Dave’s scanning equipment and moved around every detail of the garage.

“Mapping complete!” said Dave, a little bell on the equipment going bing!

“This is the fun bit...” giggled Granny, nudging Mimi who looked back at Granny suspiciously.



Suddenly, the laser beams that Dave was shining turned into bright lights, filling every nook and cranny of the garage until they couldn’t see the garage any more... They looked around and they were surrounded by blue and white... They were flying in the sky!

Mimi looked down at where the floor had been and squeaked nervously. They all followed her eyes and saw that the floor had been replaced by empty air! A long, long way down was Granny’s house and Mimi recognised the garden and the garage where they had just been. The wind ruffled their hair and a puzzled-looking pigeon flew over and settled on Gracie’s shoulder, cooing.

“Woof!” said Colin, crossly. The pigeon was not bothered.

“Ok Dave, that’s enough! Take us home!” said Granny, raising her voice over the sound of the wind.

The lights faded again and they all found themselves back in the garage, exactly where they had been sitting, as if nothing had happened...

Pip leaned over to Mimi and whispered “Mimi... Is your Granny... *Magic?!?*”

Mimi laughed and said “A bit” as Granny winked at her.

“No magic necessary! That is Dave’s new hologram projector and he can use it to turn the garage into anywhere we want to go. He connects with satellites and the internet to get a perfect picture of anywhere on Earth, he then projects it onto the walls and floor – it’s almost as good as actually being there.”

“We can visit anywhere! No passports needed and we don’t even need to get off our chairs!” explained Granny as everyone gave her and Dave a round of applause.

Maryam looked over to where the pigeon had been sitting on Gracie’s shoulder where a single feather remained behind.

“Ummm...” said Maryam, holding up the feather.

“Don’t worry about it!” said Granny, quickly hiding the feather away. “It’s all totally safe... I think.”

“Granny, does this mean that we could visit the places that we’re going to talk about?” asked Mimi, feeling an adventure coming on...

“Yes! If you want to visit a cool place on Earth, Dave can find it for you!” said Granny.

This is going to be fun...

CHAPTER

THREE



Chapter 3 – Weather from Space?

First up with their fact about Planet Earth, it was Maryam. She stood in the middle of the circle, rummaged in her pockets and took out a piece of paper.

“Ahem. Did you know that the Earth has a magnetic force field that protects it from weather in space?”

And immediately everyone spoke at once.

“Cool!”

“A force field? I thought those were only in sci-fi stories!”

“Where does it come from?”

“Why? What for? Surely there’s no weather in space?”

“Woof?” added Colin.



Once everyone had finished, Maryam looked flustered.

“Umm... I am not entirely sure.” said Maryam. “I think it comes from the North Pole or something? But I don’t know how it works...”

“That’s ok!” said Mimi. “The fun bit is finding out together! Dave, do you think you could help us?”

“Absolutely! One moment...” said Dave, an egg-timer appearing on his screen. His projector system started to whirl and glow and... All of a sudden, they were... somewhere else...

They found themselves 400km above the Earth and travelling at 28,000km per hour... They were in some kind of corridor, cramped and full of machines, screens, bits of important-looking technology and a person in a bright green jumpsuit was floating in the air in front of them, engrossed in some repairs to a panel in the wall.

“So how does this work then?” asked Maryam, taking a keen interest in all the machinery and screens around them. “Can we take a look around or what?”

“**CRIKEY!**” said the astronaut, because that is who they were, spinning around at the sound of Maryam’s voice, making them all jump. “What are you doing on the International Space Station?!”

“Woof!” said Colin, his legs doing a little doggy paddle in the air.



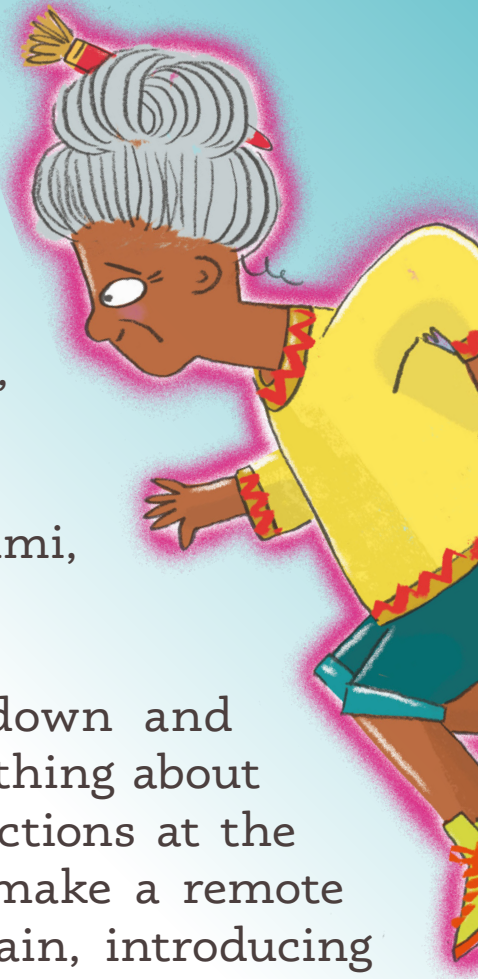
“And is that a *DOG?* Who are you people?” they continued, in surprise. They had dropped the screwdriver they were using but, being in zero gravity, it just hung in the air next to them.

“It’s ok, we’re not really here!” said Mimi, cheerfully.

Once the astronaut had calmed down and Dave had explained the situation (something about how his projection worked in both directions at the same time, using the satellite link to make a remote interactive hologram...) they started again, introducing themselves properly this time!

“Hi everyone! I’m Alys and I’m an astronaut here on the International Space Station!”

“Hi Alys!” said everyone, politely.





Alys

Alys The Astronaut

Three Words To Describe Me: Thoughtful, dedicated, patient.

A Fun Fact About Me: I can juggle eight balls at the same time. It's a shame that I can't show this off when I'm in space!

The Best Thing About My Job Is: Seeing 16 sunrises and sunsets every single day when I'm on the International Space Station.

"I understand one of you has some questions about the Earth's magnetic field?" said Alys.

"Yes, that's me!" said Maryam, waving her hand.

"Awesome! So here on the International Space Station, one of the experiments we do is to look out for solar storms, massive eruptions that come out of the Sun, and see how they interact with the Earth's magnetic field – we call this space weather!"

"Solar storms?" asked Mimi. "Like snow and wind and rain and thunder and stuff... in space?"

"Haha not quite!" chuckled Alys. "We call it space weather but it's nothing like weather we feel on Earth. All the time, the Sun is blasting out loads of stuff called plasma – this is what the Sun is made out of – and it flies out into the Solar System creating what we call the solar wind."



But rather than just gusts of air, it is loads of plasma whizzing through space.”

“Oh wow...” said Maryam. “How do we know?”

“Ooh! Come this way!” said Alys.

Floating through the corridors, they came to a big room where, on the floor, like an upside-down glass house, was a wall of windows with a breathtaking view of Earth far, far below...

Watching the Earth turn, they could recognise the shapes of coastlines, oceans and fluffy clouds and the lights from cities. Eventually they saw something unusual...

Hanging above the Earth were enormous curtains of glowing light in green, red and purple. They reminded Maryam of something... but what? “Ahh!” squeaked Maryam, remembering suddenly. “The northern lights!”

“Bingo!” said Alys, grinning. “They look a bit different from this angle, don’t they! I think it’s one of the best bits of being an astronaut getting to look at this view... The northern, and southern, lights happen when the solar wind hits the Earth’s magnetic field. The different gases in the atmosphere make the different colours!”

They all floated in silence for a bit, taking in the view but there was something bothering Maryam.

“Hang on. If the Sun is always making space weather happen, why don’t we see it all the time? And why just at the North and South poles?” asked Maryam.

“It’s happening all the time, but sometimes only very faintly and very close to the Earth’s poles. The particles get pulled to the poles, like iron filings to a magnet, and that’s why we see the aurorae¹ near the North and South Poles.” Said Alys, thinking carefully.

¹ Say OR-ROAR-AY - the scientific name for the northern and southern lights

“As for why we don’t see these events all the time, the Sun is sending gusts of solar wind out in all directions and, as the Earth is actually quite small and far away, most of them miss us which is quite lucky, really!”

“Oh? Why’s that?” asked Maryam, thinking that it was a shame not to see the northern lights all the time. It would definitely make nighttime more interesting!



“If there’s a solar storm, it makes the aurora more bright and easy to see and also for more people as they can be seen further from the poles. And whilst this is really pretty, this isn’t great for technology. Either here in space or on the ground!” said Alys.

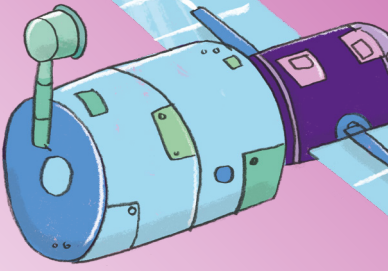
Maryam’s ears pricked up at this – she loved building things and anything electronic – and she had no clue that technology could be damaged by weather from space!

“When space weather gets really bad, it can break things like satellites, which we need for GPS and communications and loads of other things, and, back on the Earth, it can cause power cuts and all kinds of problems...” continued Alys. Maryam was shocked!

“And that’s where scientists like me come in!” said Alys. “My job here on the International Space Station is to learn more about the solar wind so that we can protect technology in space and on the ground. And people too!”

“Oh no! Space weather can hurt people too?” gasped Maryam.

“Hahaha no, don’t worry – only if you are flying very high in an airplane or up here in space! We have got a special place here where we can shelter if it gets too bad and pilots are told to change their routes or fly lower down if there’s going to be a problem.”



"The Earth's atmosphere and magnetic field do a great job of protecting life on Earth and it's only when we leave the ground that it's a real hazard. And that's why I do what I do! I want to keep people safe and make sure all the technology that we rely on can keep running!" said Alys, kindly.

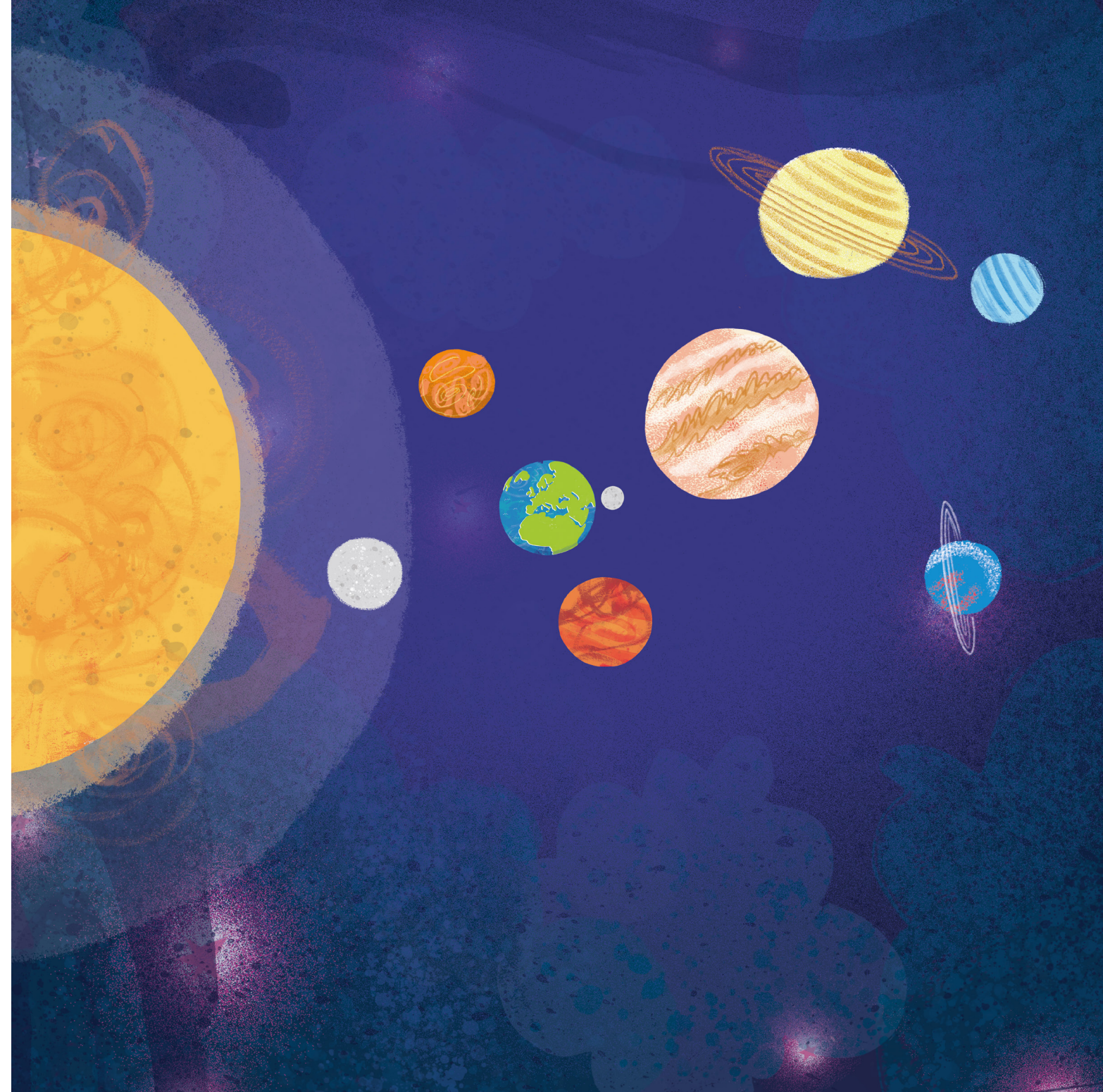
Dave beeped – it was time to go home! They all said thank you to Alys and she waved as they vanished with a flash of light.

Alys hummed happily to herself as she resumed her work and the mission commander floated past.

"Alys? Were you talking to someone?"

"Just some visitors!" she replied, cheerfully.

"You've been in space too long!" said the mission commander, as they floated down the corridor.



Chapter Four



Chapter 4 – Making Waves!

Once they had calmed down from their trip to space, it was Pip's turn to amaze the group. He went to the middle of the circle and found a piece of paper in his pocket.

“Did you know that the Earth's solid metal core is about the same temperature as the surface of the Sun?” he said loudly and clearly.

And immediately everyone all talked at once.

“HOW HOT?!”

“How is it solid? It would melt!”

“Woof?”

“Have people drilled into the middle of the Earth to find out?”



Mimi put two fingers into her mouth and whistled as loudly as she could and everyone went quiet.

“Dave, I think it's that time again!” she said, excitedly.

Dave's projector equipment whirred and started to glow and, with a flash, the walls of the garage vanished and they found themselves... Somewhere else.

They looked around and they were crowded into an office. Big windows showed an incredible view of mountains and the walls were covered in paper printouts, complicated diagrams and loads of computers and screens filled every available surface.

Pip realised that there was someone working at one of the computers and peered over their shoulder to try and work out what they were doing...

“Aaaaaaah!” yelled the person, jumping out of their office chair, obviously very surprised to see a crowd of children, a dog, a robot and Granny turning up at their work unannounced.

Once Dave had explained what was going on, they all introduced themselves properly.

“Hi everyone! I’m Suki and welcome to my seismology² lab!” said Suki, smiling at them all warmly.

“Hi Suki!” they all cheered together. Pip raised his hand and Suki invited him to ask his big questions.

“We have been finding out about the core of the Earth and, we were wondering, how do we know what is inside the Earth? And why is it so hot there? And why is the core solid metal? Why doesn’t it melt? And what is seismology anyway?” he said, breathlessly.

² Say SIZE-MOL-OH-GEE



Suki

Suki The Seismologist

Three Words To Describe Me: Observant, confident, and chatty.

A Fun Fact About Me: I love musical theatre! I have performed in lots of shows ever since I was very young.

The Best Thing About My Job Is: It’s very unpredictable! Earthquakes can happen at any time and anywhere so no two days at work is ever the same.

“Whoa, that’s a lot of questions!” replied Suki, laughing. “Let’s start with seismology...”

But before she could tell them more, the room started to shake...

“**EARTHQUAKE!**” shouted Mimi, over the sound of Colin barking as loudly as he could.

The computer screens all came to life with loads of information scrolling past. Printers spat out dozens of pieces of paper covered in wiggly lines, their noise adding to the chaos.



Only Suki looked relaxed and waited patiently for this mild annoyance to pass.

And then, as suddenly as it had happened, the office stopped shaking.

“Woof.” Said Colin, crossly, once more before calming down again.

“**THAT** is seismology!” said Suki. “I’m a seismologist and we study earthquakes! And my lab is in a place where we get loads of earthquakes – a few little ones like that every day. We keep watch for earthquakes all over the world and want to learn how to predict them to keep people safe and find out more about our planet.”

Everyone gasped – this sounded like a seriously cool job!

“Where do earthquakes come from?” asked Mimi.

“The Earth's surface is always moving. Although the ground feels pretty solid, it's actually a thin layer of rock on top of a hot, molten layer called the mantle which churns and moves incredibly slowly... The rock on top is in big pieces, a bit like islands, and they're moved by these currents in the mantle underneath. When these giant pieces rub against each other or crash into each other, they can make vibrations which we feel as earthquakes. These massive islands of rock are called tectonic plates and they form the surface of the world that we live on.” Suki let this sink in as everyone got their heads around the idea of living on floating islands!

“When earthquakes happen, like that little one just now, the shaking, called vibrations, can be felt by people near to the earthquake, but they also travel underground and so can be detected all over the Earth. But not necessarily where you might expect...” she continued.

“What happens?” asked Pip, excited about the mystery.

“The vibrations travel like waves in all sorts of directions. There's actually two types of waves and they can each travel through different parts of the inside of the Earth - this means that they don't always travel in straight lines... They get reflected and redirected all around the world!”

Suki pointed at a big map of the world that was pinned to the wall.

“Scientists like me work all over the world and we can detect earthquakes from the other side of the planet! There are about 1,500 earthquakes across the world every day, most of them way too small for people to feel, but we can detect these waves and compare data with other places to work out where they've come from.”

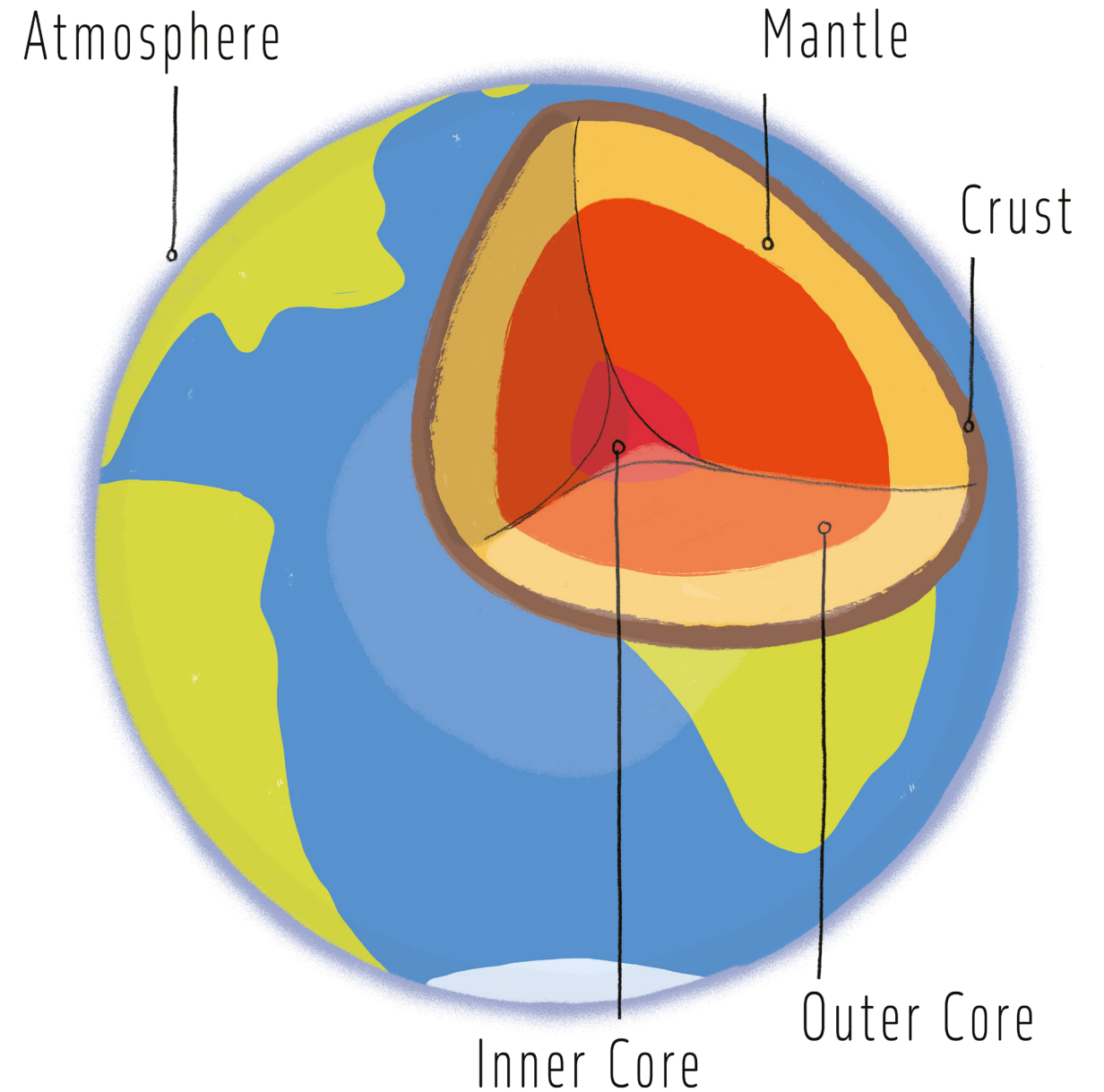
“How does that help us work out what the inside of the Earth looks like...?” asked Pip, frowning.



"We can use all these different kinds of measurements to build up a map of the inside of the planet. What we've found is that there is a solid metal inner core right in the middle of the planet and, wrapped around that, there's a liquid metal outer core."

"Then, around that, there's that other layer we talked about, the mantle. This is not quite a liquid, not quite a solid! It's basically like solid rock but, over many, many years, it oozes like very sticky honey! This is what our islands of rock sit upon. Making this map of the inside of the Earth was a really exciting puzzle to solve and needed scientists from all over the world to work together!"

"Wow!" said Pip - he loves a puzzle! And then he remembered another mystery. "Why is the inner bit solid metal if the outer bit is liquid?"



“It’s right in the middle of the Earth with the whole weight of the planet pressing down on it on all sides. Even though it is way hotter than the temperature where metal melts into a liquid, all of this pressure squeezes the core together into a solid. And the outer core is liquid because it’s not feeling such incredible forces so that bit’s liquid metal - as we would expect because it is really, really hot!”

“Ooh - if the core is made from metal, does that have anything to do with the magnetic field?” piped up Maryam, remembering the chat they had with Alys the Astronaut.

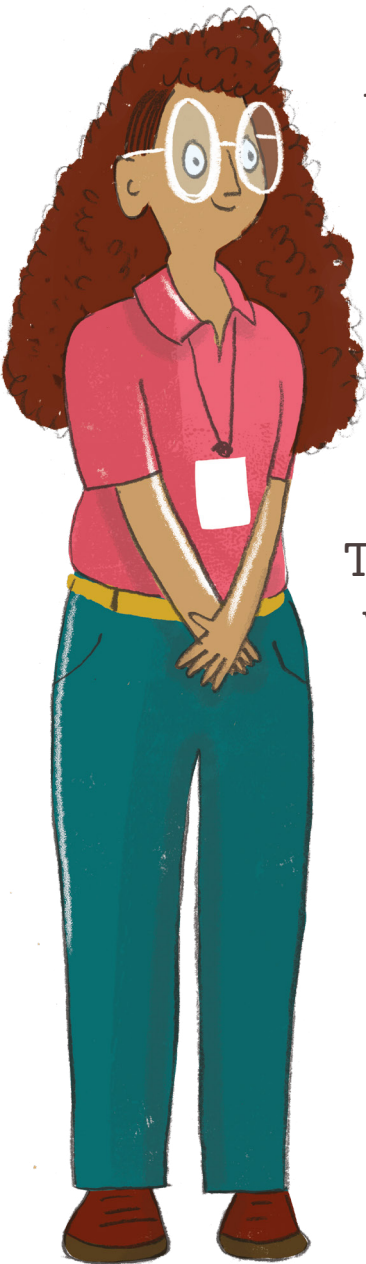
“Yes, well done! The liquid metal outer core is what creates our magnetic field - the middle of the Earth is basically a giant magnet that keeps us safe from space weather!” replied Suki.

“Actually, that’s not the only way that the inside of the Earth makes life here on the surface possible.”

"We get the protection of the magnetic field but did you know that the moving mantle also helped to create the Earth's atmosphere back when the planet was young?" she added.

Everyone stared at her, amazed. They weren’t breathing air made of rocks... Were they?

“The atmosphere came from loads of gas and water vapour released when volcanoes erupted back when the Earth was young. As it cooled, the water vapour turned into one giant ocean. The atmosphere got added to by gasses and water from meteorites from space and that was enough for the first signs of life to appear. They needed carbon dioxide gas to live, which was also coming out of the inside of the Earth during earthquakes, so that helped them to survive and, eventually, the bacteria that made oxygen came along. One thing led to another and a few billion years later... Here we are!” said Suki, waving her arms wide.

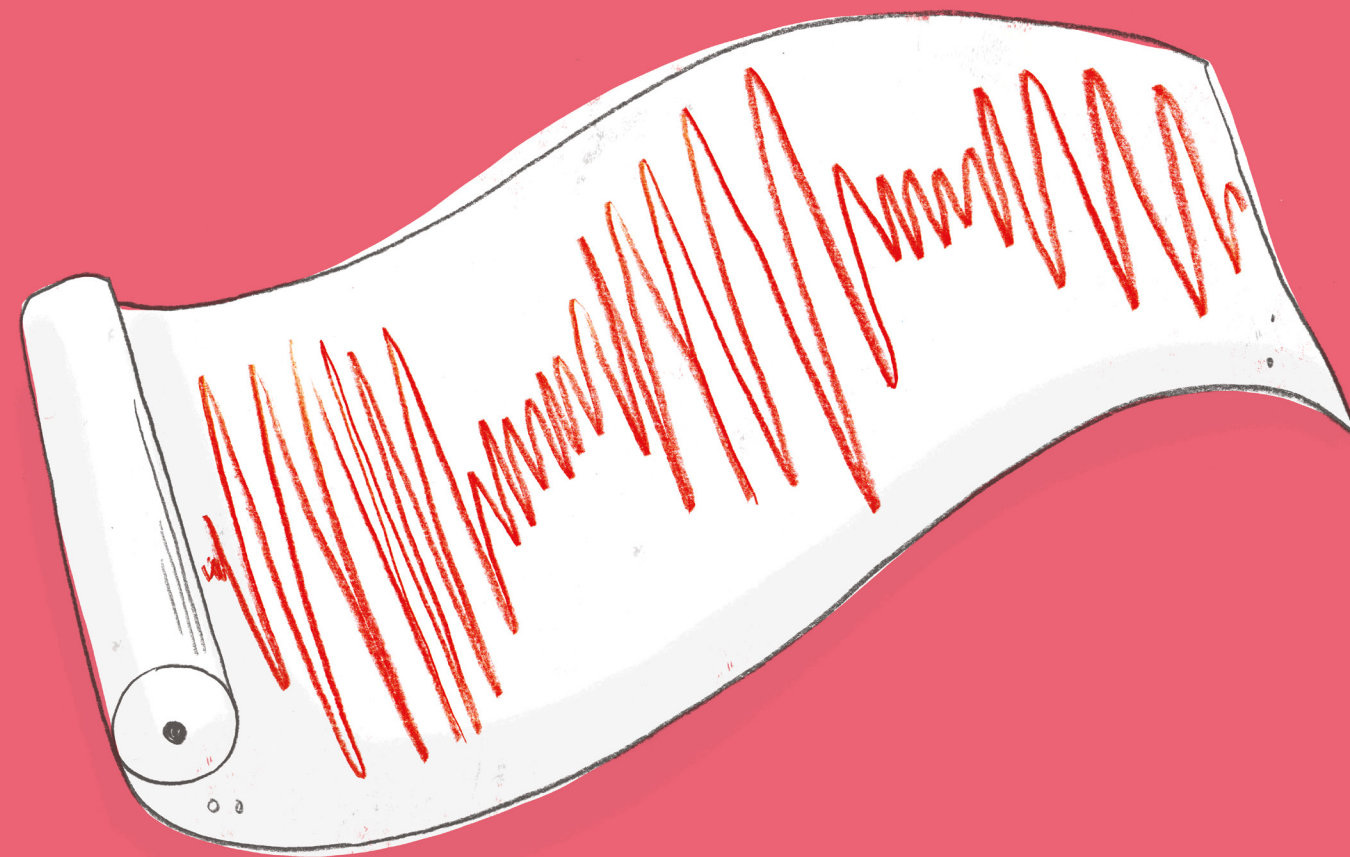


“This is why I study seismology! I want to uncover all of the secrets of the Earth and why we’re here.” she said happily.

Pip had a huge smile – he had met a fellow puzzle-solver! And what better puzzle than how we got here in the first place.

Dave beeped and it was time to go again. They all said a huge thank you to Suki and, with a flash of light, vanished.

Finding herself waving at empty space, Suki chuckled and got back to work. She had loads of new scientific information to look at!



CHAPTER

FIVE



Chapter 5 – Highest and Lowest!

Pok. Pok. Pok. Pok. Pok...

Gracie walked into the middle of the circle without taking her eyes off a ping-pong ball that she was bouncing up into the air with a table tennis bat. She flicked it high into the roof and caught it on the way down. She took a little bow and then got on with her amazing fact.

“Thank you, thank you...” waving to the imaginary applause of her audience.

“Did you know that if the Earth was shrunk down to **THIS** size” she said, holding the ping-pong ball above her head. “That the Earth would look and feel as smooth as this ball?”

And immediately everyone spoke at once.

“What? Even all the mountains?”



“How about the deepest bits of the oceans?”

“Woof?”

They all knew the drill by now! Dave’s projector started to glow and... They found themselves... Somewhere else...

All around them, the ocean stretched all the way to the horizon with no land in sight. They were standing on the deck of a big ship which rocked gently under their feet.



There was a loud buzzing sound and they ducked and ran as a drone landed on the deck next to them.

“Stowaways!” shouted a man from across the deck, noticing them for the first time. He ran over waving his arms in a panic to see what on earth they were doing there!

After Dave explained how they could be seen and what they were all doing there, the sailor understood and calmed down a bit.



“Welcome aboard! I’m Omar and welcome to Point Nemo, right in the middle of the Pacific Ocean.” he shouted over the wind, pointing at the open sea around them.

“Hi Omar!” they all shouted. Even though they weren’t really there, the wind was still loud and, somehow, ruffled their hair and made Colin’s ears flap in the breeze.



Omar

Omar The Oceanographer

Three Words To Describe Me: Determined, organised, collaborative.

A Fun Fact About Me: I have ridden the five biggest and fastest rollercoasters in the world! Working on ships during rough storms mean that it’s almost impossible to make me feel dizzy or sick.

The Best Thing About My Job Is: When I’m out on the big, blue ocean, I get to see incredible sea creatures like whales, dolphins, and turtles! Seeing them reminds me how wonderful our world is.

“I’m an oceanographer³ working on this ship to better understand the Earth’s oceans! For example, we’re currently at Point Nemo, the most isolated part of the sea. You literally can’t get any further from anyone else – in fact, we might even be closer to astronauts than our nearest neighbours on land!”

They were all very impressed – this was some seriously cool sailing!

“It gets even better...” continued Omar. “Because we’re as far from people as we can get, this is the safest place in the world to crash spacecraft and satellites when they’ve finished their missions! There are about 260 bits of space junk underneath our ship, safely sitting on the seabed.”

“How deep is the sea?” asked Gracie, imagining the rockets rusting under the sea with coral, fish and octopuses turning them into their houses.

³ Say OCEAN-OG-RA-FER

“Here, it’s about 4 kilometres deep. And that is about average for the depth of the ocean. But that’s really shallow compared to the deepest part of the ocean – the Challenger Deep!” Omar waggled his fingers mysteriously.

Everyone made impressed noises, this sounded spooky!

“The Challenger Deep is nearly three times deeper than this at nearly 11 kilometres deep. If you put Mount Everest at the bottom, it wouldn’t come close to the surface!”

Everyone made *very* impressed noises!

Gracie remembered her ping-pong ball and showed it to Omar.

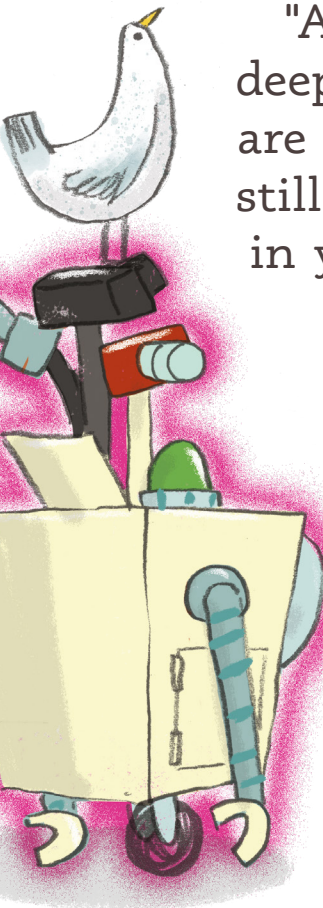
“We’re trying to find out – if you shrunk the Earth down to the size of this, would the Earth be smoother or rougher than the ball? It’s got to be rougher, right? If the sea is that deep?” she asked.

"Oh that is a really good question! I wondered about how rough the Earth would feel when I first started studying the oceans - it's actually about the same! A ball like that can only have tiny little bumps and scratches in it, so small you'd probably need a microscope to see them."

"And the Earth is very similar! Even though the deepest parts of the sea and the tallest mountains are very far apart, the Earth is so big that it would still feel like a smooth sphere if you could hold it in your hand!"

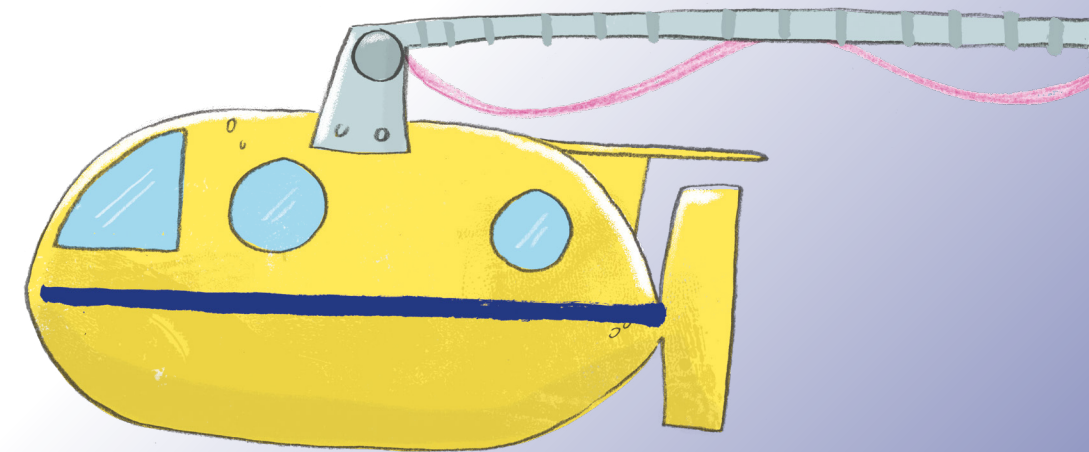
"Oh wow!" said Gracie, looking at the ball in her hand with fresh eyes.

"And this is why I love the oceans." said Omar, staring out to sea. "About two thirds of the Earth is covered in water and we know more about the surface of the Moon than we do about the bottom of the sea!"



Omar took them on a tour of the research ship, he introduced his shipmates, showing them the tiny little canteen where the crew had their meals, the science labs where they do their work and repair their drones and the bright yellow little robotic submarines that explore the sea floor.

"I love exploring the oceans but I do get homesick!" he said, showing them the pictures of his friends and family on his phone. "But we do a regular video chat so home never feels too far away! And it makes things easier to know that what we're doing is really important."



Gracie gave him a questioning look – exploring the sea sounded like a great adventure but she'd never thought about it being really important before.

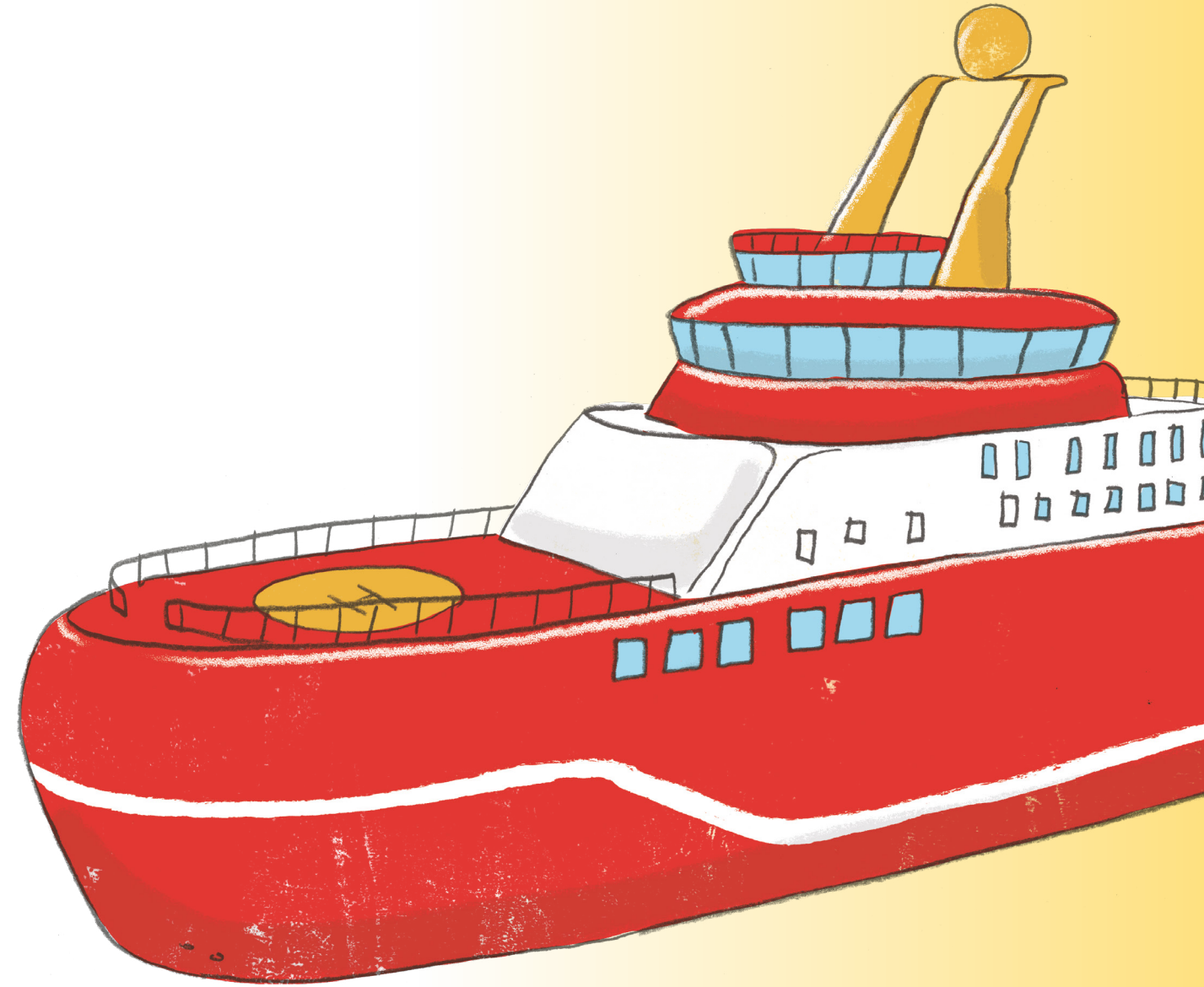
"Life all over the world, not just underwater, depends on the sea."

"We need to know what the currents of the sea are doing, bringing warm water to land, changing the weather..."

"And knowing how sea levels are changing is incredibly important for people that live on islands or near the coastline. It's great to be able to make a difference as a scientist!" said Omar, happily.

They took one last look at the sea and it was time to go. Colin couldn't wait, he was no sea-dog!

In a flash of light, they were back in the garage. Back on solid land again.





Chapter
forty-six

Chapter 6 – Making Mountains!

Eoin⁴ took his place in the middle of the circle and looked around with a shocked expression on his face.

“Did you know that Mount Everest might not be the tallest mountain on Earth?” he said, dramatically.

Once again, everyone immediately started talking at the same time.

“Of course it is!”

“Well, if not that, what is the tallest?”

“Woof?”

“Where is this mystery mountain then?”

After everyone had piped down, Eoin looked thoughtful.



⁴ Say OH-WENN

“I guess technically it’s not a mountain, it’s a volcano... But what’s the difference, anyway? Is a mountain just a volcano that’s dried up and cooled down?” he asked and everyone else shrugged. Even Granny had to think about this one.

“Dave,” said Mimi. “Let’s go!”

The room brightened and the walls vanished. And they found themselves... Somewhere else.

They were perched on a steep, rocky slope. Steam and vapour poured out of holes and cracks in the ground and, with a blip and a blop sound, bright orange lava was trickling slowly downhill towards them...

“**VOLCANO!!!**” shouted Mimi and they all moved out of the way to let the lava go past. Experimentally, Granny reached a hand towards it.

“It’s ok! It feels a bit warm but Dave is keeping us safe!” she said, relieved. After all, they were really safely in the garage. There are lots of fun things to do on an adventure but touching molten lava coming out of a volcano is definitely not one of them!

With a large mask on their face to protect them from the gas coming out of the ground, a mysterious figure was standing next to the lava flow. They were also wearing big heavy gloves and a helmet on their head to keep them safe – it looked like working on a volcano was serious business.

Very carefully, they dipped a metal bucket on the end of a long stick into the lava and pulled out a little sample.

They looked up and saw the gang who waved cheerfully and they dropped the bucket in surprise.

“**AAAAAGH!** What are you doing here? This is a volcano!!!” they shouted, waving their arms in panic.

Once they had calmed down a bit and collected a new sample of the lava, confident that our heroes weren’t in any danger, they said hello properly. They retreated to a safe distance from the glowing lava and they took off their mask, gloves and helmet and looked a lot more human.

“Hello everyone! I’m Vanya and welcome to my volcano!” they said, cheerfully.

“Hi Vanya!” said everyone, politely.





Vanya

Vanya The Volcanologist

Three Words To Describe Me: Brave, thorough, and adaptable.

A Fun Fact About Me: I'm a collector! I collect many things, from cool rocks I find on the side of volcanoes, to comic books and trading card games, and even stamps.

The Best Thing About My Job Is: There's nothing like seeing a volcano erupt! The booming explosion! The scorching heat! The raw power as the ground underneath you shake! You really feel like you're at the heart of nature.

"Vanya - can you settle a question for us?" asked Eoin. "What is the tallest thing on Earth? Is it Mount Everest or is it somewhere else?"

"Oooh! That's such a good question!" replied Vanya. "It all depends on how you measure it! If you measure from sea level to the top, then yes, Mount Everest is the tallest mountain on Earth."

"Aha!" said Mimi.

"Told you!" said Gracie.

"But!" interrupted Vanya. "If you measure from the bottom of the mountain to the top, it's actually Mauna Kea in Hawaii! It's a volcano that is coming up from the very bottom of the sea. Even though the bit sticking up above the water isn't that tall, if you measure the whole thing, it's actually over 10,000 metres tall. And that's over 10% taller than Mount Everest!" they said excitedly.

Everyone was absolutely amazed – they didn’t expect it to be that tall!

“What’s the difference between a mountain and a volcano, anyway?” asked Eoin thoughtfully.

“That is another excellent question!” said Vanya, happily. “Volcanoes are a type of mountain but not all mountains are volcanoes! They come into being in very different ways...”

“Oh!” said Pip suddenly, remembering their visit to Suki the Seismologist. “Does this have something to do with tectonic plates?”

“Yes! Exactly!” said Vanya. “Tectonic plates are always moving because of the currents in the mantle underneath the Earth's crust. Sometimes they move apart and sometimes they crash into each other! When they crash into each other, they can push each other up, like wrinkles in a carpet.”

“And this is where Mount Everest and the rest of the Himalayan mountains came from! The plates that they sit on are moving together and create these mountains.”

“What about volcanoes? Where do they come from?” asked Mimi.

“When plates move apart or together, they can make a space or a weak patch that liquid rock called magma can flood through. It cools down and makes mountain-shaped volcanoes that build up layer on layer until they can be really tall! And this can happen on land and under the sea – like Mauna Kea!”

“It is one of five volcanoes that make the island of Hawaii.” They continued. “It’s not erupted for thousands of years and, because it is so tall and the air at the top is so clear and the night skies are so dark, it is an amazing place to do stargazing!”

"It's also very, very precious to the Hawaiian people with strict rules about how the land can be used - as scientists, we need to listen to the people that live there and make sure that we are not breaking those rules whilst we're doing our work." said Vanya.

"Why don't we see volcanoes and mountains everywhere?" asked Eoin, thoughtfully. He didn't see many where he lives and it would be very convenient to have one around the corner to look at when he got home!

"Excellent question." replied Vanya, even more happily. "For the most part, all the exciting bits like volcanoes, mountains and earthquakes happen at the edges of the tectonic plates. But there are exceptions! Hotspot volcanoes happen in the middle of plates where a bit of the mantle is extra hot."

"This melts through the crust and makes volcanoes in unexpected places! And, as the plate moves, the hot spot makes another volcano next door to it, and another, and this makes chains of volcanoes - like the Canary Islands off the coast of Africa!"

Vanya took them on a tour of their volcano and told them a bit about why they became a volcanologist.

When they were little, they saw a volcanic eruption on the television news - it looked incredible but also a bit scary! It inspired them to learn more about volcanoes to understand their power and where they come from, not just because they are really exciting but to also help keep people safe by understanding when they might erupt.

Before they knew it, it was time to go again! Vanya waved as, with a flash of light, our friends vanished. They went back to their work, whistling cheerfully as they climbed the grumbling volcano - being a scientist is never dull!

CHAPTER SEVEN



Chapter 7 – Coldest, Windiest and Driest!

Finally, it was Mimi's turn to share her Planet Earth fact. She pulled a piece of paper from the pocket of her dungarees and read it out.

“Did you know that the coldest, driest and windiest places on Earth are in Antarctica?”

Yet again, everyone started speaking at once.

“Dry? It's full of ice!”

“How is it windy? All the snow would blow away!”

“Woof.”

“Let's go Dave!” said Mimi, grinning.

The walls of the garage faded and they found themselves... Somewhere else. On the Moon! Just kidding... They were in Antarctica!



Even as holograms, they realised that it was indeed freezing cold and very windy! Two people were working nearby, bundled up in massive coats that made them look enormous. Using a big drill, they were cutting a deep hole into the ice at their feet. In the background, a massive structure stood up on legs, making it look a bit like a robotic insect was walking through the frozen landscape.

Other than the two figures in coats and our heroes, the only other movement was a group of very curious penguins who were waddling over to investigate the new arrivals. They squawked quietly to themselves as Colin walked over, giving them a sniff. Deciding that he wanted to play, the penguins started to chase him and Colin galloped over the ice, barking happily.

The two people with the drill looked up and nearly jumped out of their coats! What on Earth was a dog doing chasing the penguins?! And who were these children which had suddenly appeared?

One of the people marched back to the base as quickly as they could – perhaps they had been working too hard and they were imagining things! They needed a cup of tea and a sit down!

The other scientist was a bit more curious and, when they had finished their drilling, they went over to say hello.

“Hi everyone! I’m Cillian! And, if you don’t mind me asking, what are you doing in Antarctica?”



Cillian

Cillian The Climate Scientist

Three Words To Describe Me: Creative, calm, problem-solver.

A Fun Fact About Me: I love taking photographs and Antarctica is so different to any other place on Earth that I make sure I always have a camera with me. I don't want to miss a single shot!

The Best Thing About My Job Is: The community! You might think that it can get lonely and boring with only 50 people around you, but we're always finding ways to have fun and learn from each other, like when Chef turned the kitchen into a cooking school.

The gang explained what they were up to and Cillian brought them back to the research base where they took off their massive coat, boots, gloves and cold weather gear and they were a lot more human-sized in their indoor clothes.

They all sat in the base's break room and looked out at the snow and ice outside, hearing the wind batter the wall.

"So... why is Antarctica so cold? And windy! And is it dry?" asked Mimi, in a rush, remembering why they were there. Cillian grinned.

"Antarctica is one of the most extreme environments on Earth! And yes, it is very cold **AND** windy **AND**, weirdly, dry!"

"Let's start with cold!" said Cillian.

"We are sitting on top of a sheet of ice that is about 2,000 metres thick! All that ice keeps us really cold and, because we're high up, it feels even colder."

"We're also far from the water which, weirdly, would keep us warm. The other thing is that the atmosphere is a lot thinner here so we don't get a lot of cloud cover – the ice and snow reflect the sunlight and that also keeps us cold."

"Wow! It's like living on a giant ice cube!" said Mimi.

"And it's actually a desert! We get less than 15cm of snow and rain every year. This is because it is so cold that the air can't hold onto any water and, by the time you get into the middle of Antarctica, any damp air from the ocean is long gone."

"But how is it a desert if it's made of ice?" asked Mimi, getting confused.

"It's a desert if it doesn't get any rain – it doesn't need to be hot or sandy. Even though it's 98% made from water, all of it is locked into ice which means that Antarctica is a desert, just like the Sahara!"

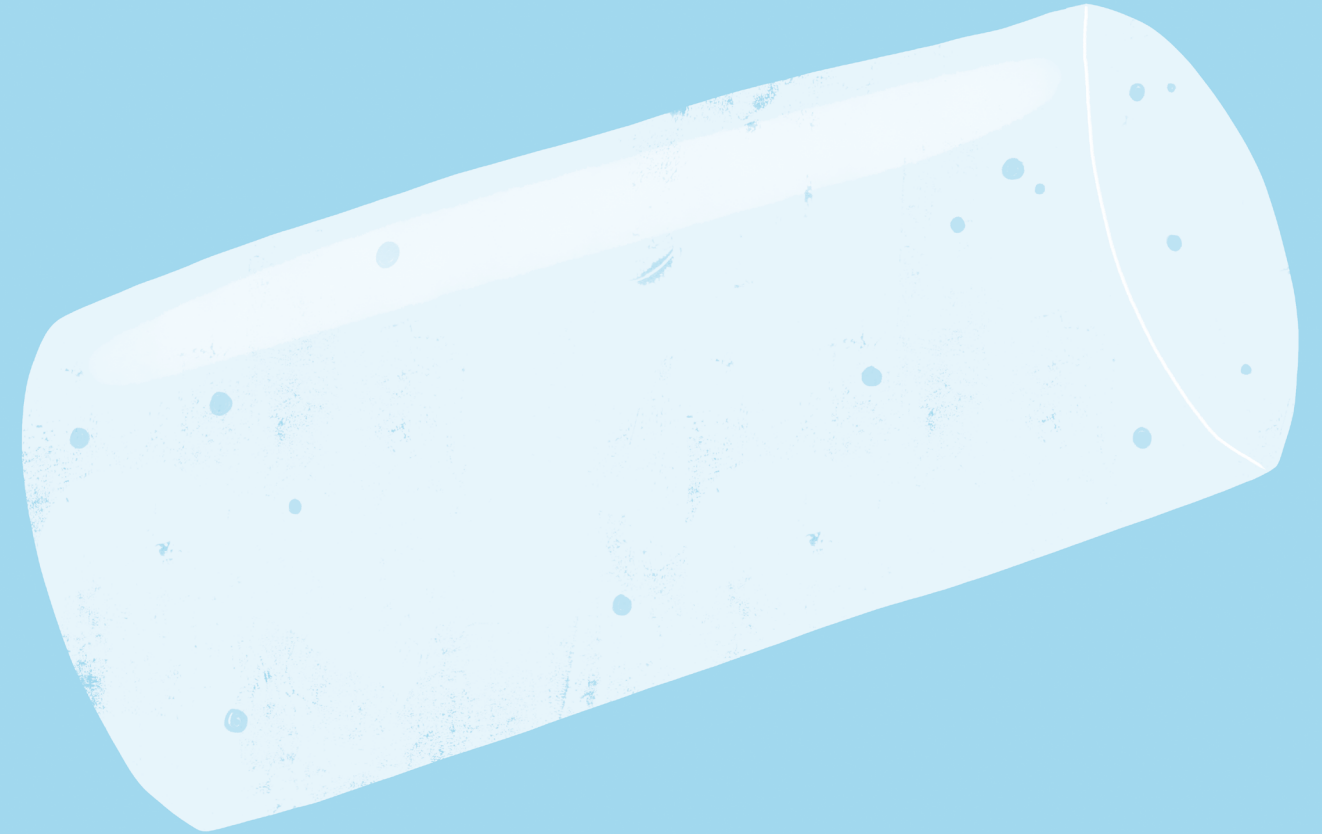
"But what about the wind? Where does that come from?" asked Mimi.

"Because Antarctica is a big, tall, massive lump of ice, the air at the top gets really cold and packed together. This then tumbles down the sides, rushing outwards like an avalanche made out of air! As it accelerates, it can create some of the strongest winds on Earth, sometimes over 200km per hour. That's like a fast sports car!" They looked at each other, absolutely amazed.

"So... it's freezing cold, completely dry and incredibly windy. What are you doing here?" asked Mimi, having no clue why someone would want to work in such a place.

Beckoning them, Cillian took them into their lab and opened a freezer.

Holding it carefully like treasure, Cillian showed them the cylinder of ice that they had pulled out of the ground...



“This is what I’m doing here! I’m a climate scientist and I’m here to see what the ice can tell us about what the Earth’s atmosphere was like thousands of years ago and how it has changed between then and now.”

Pointing at the tiny bubbles of air trapped in the ice, they explained that this ice contained samples of the atmosphere that were held in place when the ice was made, keeping it perfectly preserved.

“Scientists like me can see what the air contains and compare it to air samples from different time periods. We can build up a picture of how the Earth’s atmosphere has changed over time!”

“What has changed?” asked Mimi. “Air is just... air?”

“It feels like that, doesn’t it!” replied Cillian. “In fact, the atmosphere has changed a lot in the last couple of hundred years.”

“Ever since people invented things like the steam engine, the car, power plants and big factories, the atmosphere has been changing. All of these inventions that make our lives easier also make gases as they work, that have been going into the air for hundreds of years. This means that there’s lots more of what are called greenhouse gases in the atmosphere. Gasses that keep the earth warm, like a greenhouse.”

“Like carbon dioxide?” asked Mimi, remembering what she’d heard on TV.

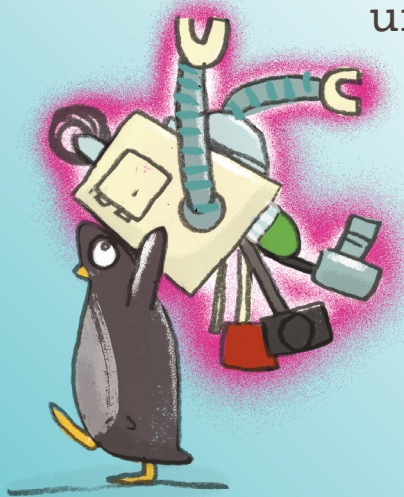
“Yes! That’s one of them! There are a load of different types of gas that keep the Earth warm. In the past, that was a really good thing because otherwise we wouldn’t be able to live here! But, if there’s too much, it’s like putting on too many coats, eventually you’ll overheat! All around the world, people are feeling the effects – we call it climate change.”

Some places get warmer or colder or drier or wetter, sea levels are going up because ice is melting, and lots of other things are happening.” said Cillian with a serious expression.

“What can we do to stop this?” asked Mimi. Everyone else leaned in, also looking serious.

“One of the biggest things that we can do is to move to different ways of making electricity! Rather than burning coal or oil or gas in power plants, which makes lots of greenhouse gases, we can use new machines that make electricity from the light of the Sun, the blowing of the wind, the movement of the ocean and the heat that’s under the ground!” he said.

“Scientists all around the world are working on solutions to climate change – it’s up to the people in charge and, well, everyone to choose to make a difference and do their bit to help our planet.”



“Can I do anything?” asked Mimi. She wanted to help too!

“Yes! You can choose things like riding a bike or walking instead of taking the car, because car engines make lots of greenhouse gases. You can take the train rather than flying in an airplane as their engines make even more. If you do things like repairing your clothes or buying second hand things rather than new ones, you’ll save on all the greenhouse gases that are made alongside brand-new items in factories. And by unplugging electrical items you aren’t using and turning off the lights in rooms with nobody in them, you’ll save electricity!”

Mimi nodded. She always made sure the recycling was being done properly but she was definitely going to take these new ideas to her mum and dad when she got home!

They all took one last look at the ice and snow before heading back to the garage again. It’s an incredible world, we all need to do our bit to look after it!



Chapter 8 – Party Time!

They all found themselves back where they started, sitting in a circle in Granny's garage. Colin had calmed down after chasing the penguins and he was fast asleep on top of Mimi's feet.

What a day! They had been in an earthquake, seen molten lava and the ice of Antarctica and travelled the oceans and even been into space!

Dave trundled out of the garage and came back a few minutes later with a tray of juice and Granny's famous cheese-and-crisps sandwiches. Absolutely ravenous, they all dived in and, once they had finished and Colin had licked the crumbs off the plates, they wondered what to do next...

"So... What now?" asked Mimi.

"I think everyone needs to know about the things we found out today!" said Eoin.
"Things like where mountains come from!"



"And how to protect technology from space weather!" said Maryam.

"And how we found out what the inside of the Earth looks like!" said Pip.

"And how incredible the oceans are!" said Gracie.

"The Earth really is amazing..." said Mimi. But she was a little bit troubled – life on Earth was so precious but with volcanoes, earthquakes, climate change and space weather, how do you keep it safe? And then she remembered all of the great work her new science friends were doing. It sounded so much fun but also really important.

"I've got an idea... How about we write a story. A story about what we did today? About our adventure!" said Mimi and everyone started nodding.



Gracie found a big piece of paper and a handful of pens whilst Pip cleared a space for it and they all crowded around...

Maryam wrote the title at the top: *“Our Planet Earth Adventure by Eoin, Gracie, Maryam, Mimi and Pip.”*

“Woof.” Grunted Colin from his spot on Mimi’s feet.

“...And Colin the Dog.”

“Ok... Chapter One...” said Mimi as she wrote, her tongue sticking out of the corner of her mouth as she concentrated.

And then everyone started talking at once...



**Meet Some Real-Life
Science Super Stars!**

Emma-Claire Gurney

PhD Student at the University of Birmingham

What Do You Do? I study how climate change is affecting the ionosphere, which is a region of Earth's atmosphere high above our heads that is important for satellites and radio communication. Down where we live, the air is getting hotter and expanding, but higher up in the atmosphere, it's actually cooling down and shrinking!

Hobbies: Knitting, swimming, and hiking!

How Did You Get To Where You Are Now? I have always loved learning; when I was young I was absolutely fascinated with space. But then at university I realised that home is very important and we need to look after our planet! The research I get to do every day is the perfect mix of really cool space stuff, and really interesting climate stuff.

What Are The People You Work With Like? Really, really clever, but also funny, and best of all, supportive. There is never a quiet day where we work; finding a room full of scientists arguing about whether a sheep is actually a sheep, or just a weird-looking alpaca, can get quite interesting. I'm grateful every day to have their support and encouragement.

Where Is Your Favourite Place In The World And Why? It's too hard to pick one - I think wherever I am in the moment! Every place has something special about it, whether it's the people who are there, a great view, or enjoying the familiar feeling of being at home. I want to make the most of every moment!



Emma

Dr Holly Ayres

Climate Scientist at the
National Oceanography Centre

What Do You Do? I research how changes in the ocean and ice, really, really far away, impact our weather and climate here in the UK.

How Did You Get To Where You Are Now?

I wasn't the top student in science or maths, but I was determined. I found something that interested me, tried, failed (a lot), and tried again, with the support of some brilliant teachers. I didn't grow up around people who went to university, so I didn't know what to do to get to where I wanted, I just knew I wanted to be a climate scientist. I did really well at university and worked on a research ship around Antarctica to do cool science in the real world. When I applied the subjects that I struggled with in school to the real world, they started to make sense to me.

Is Your Job Hard Or Dangerous Or Fun? My job is a little hard, it involves a lot of maths, coding and writing. I am dyslexic, so these were all challenges for me during school, but I got a lot better at them. My job can be dangerous, I have been on a ship in the middle of the ocean during a big storm, but I know I am always safe with the people I work with. But most of all, my job is fun! I get to work on cool science, with great people, and often a lot of freedom to work how I want.



Holly

Laura Stenhouse

Geomagnetic Data Processor

What Do You Do? From my desk in Edinburgh, Scotland, I watch how Earth's magnetic field changes! This invisible force protects us from the Sun and helps compasses point north. I collect measurements from around the world so scientists can keep maps and navigation tools accurate and understand things like power problems or the science behind our beautiful aurorae.

How Did You Get To Where You Are Now? I was fascinated with learning about the world from a young age but I did not have the confidence to see myself to be like the scientists I admired. It was through volunteering and meeting many scientists that I was inspired and thought, 'why not me?' I studied for six years with the Open University whilst working to get my degree in physics, and was hired at my current job just before I graduated. It's a dream come true!

What Inspired You To Choose Your Job? I chose this job because I love being a data detective! My favourite part is staring at and looking for tiny wiggles in magnetograms: special graphs that trace the invisible magnetic field all around our planet. Sometimes these bumps are caused by massive solar storms in space, but other times they are caused by something closer to home, like a car driving too close to our observatories, or even a sheep wearing a magnetic tag jumping over the fence!

Where Is Your Favourite Place In The World And Why? Wherever my partner is. Everything is more fun with her around.



Laura. S

Dr Laura Wainman

Volcanologist at the University of Leeds

What Do You Do? I investigate the gases and particles that are emitted by volcanoes, I often do this by using a drone to fly directly into the volcanic plume to collect a sample! The makeup of these gases and particles can tell us about what important processes are happening deep underneath a volcano. Once they are released in the atmosphere, these gases and particles can also have wide-ranging effects on global climate, air pollution, and even human health.

Hobbies: Rock Climbing, bird-watching, and triathlon.

What Is The Best Thing About What You Do? Getting to spend lots of time outside in nature, exploring amazing places around the planet, and meeting interesting people from a variety of backgrounds.

Is Your Job Hard Or Dangerous Or Fun? All of the above! Volcanoes can be challenging places to work, but we are always very careful to minimise the risks. Working in the field can be very tiring with lots of equipment to carry and look after, but it's also enormously fun! Every time I see a volcano, it is an awesome experience, especially when I get to share that with friends.

If You Could Holographically Visit Anywhere On Earth Where Would It Be? Deep underneath a volcano! I'd love to see how magma moves and interacts long before it is erupted at the surface.



Laura. W

Miguel Rojas-Quesada

PhD Student at the University of Glasgow

What Do You Do? I study the Sun. It might look calm from far away, but it is actually very active and sometimes sends energy toward Earth that can affect things like satellites, technology, and even the northern lights.

Hobbies: I love dancing, Latin music, and playing volleyball.

How Did You Get To Where You Are Now? I didn't do it alone! My family, teachers, and friends helped me a lot along the way. They encouraged me to keep learning and follow my dreams. Their guidance and encouragement have been essential throughout my journey.

What Inspired You To Choose Your Job? When I was a kid, I loved learning about space. However, I wanted to study something closer to us, which led me to develop a deep passion for understanding our own star, the Sun, and its effects on Earth.

Where Is Your Favourite Place In The World And Why? My favourite place is Poás Volcano in Costa Rica. I grew up near it, and it always reminds me how amazing our planet is. Plus, the nature around it makes me feel calm and happy.

If You Could Holographically Visit Anywhere On Earth Where Would It Be? I would love to visit where tectonic plates meet, deep underground, to see how the Earth moves and changes – it would be like watching our planet alive!



Miguel

Dr Nilanthy Balakrishnan

Senior Lecturer in Physics at the University of Keele

What Do You Do? I'm a physicist who loves exploring how the world works! I teach university students about physics and materials, and I create new materials that can store energy safely and sustainably. One of the big questions I try to answer is: Can we capture waste energy from the world around us, like vibrations of our car engine, and store it to use as electricity later?

What Three Words Would You Use To Describe Yourself?
Motivated, passionate, and curious.

What Is The Best Thing About What You Do? I get to work on ideas that could help protect our planet, like developing materials for renewable energy. It feels exciting to know that my work could help make Earth a safer and more sustainable place for everyone.

Is Your Job Hard Or Dangerous Or Fun? It's a mix of everything! Discovering new materials and running experiments is exciting and fun. Working in a laboratory comes with some risks, so we always follow safety rules carefully. One of the biggest challenges in my job is turning complex scientific ideas into simple, clear, and exciting explanations that everyone can understand.

If You Could Holographically Visit Anywhere On Earth Where Would It Be?
If I could explore anywhere, I would dive deep under the ocean to see the colourful marine world. The hidden life beneath the sea feels like a magical new universe waiting to be discovered!



Nilanthy

Dr Ruth Geen

Assistant Professor in Atmospheric Sciences
at the University of Birmingham

What Do You Do? I research how the monsoons work, and how they could change as the world gets warmer. Monsoons are very large wind patterns that bring rain to places like India and China. Two out of every three people on the planet depend on monsoon rain for water and growing food.

Hobbies: I like running, kayaking and climbing.

Is Your Job Hard Or Dangerous Or Fun? My job is fun! I get to work with climate models and design creative alternative worlds that help us understand our world better. I get to talk to interesting people about science, and sometimes I get to travel to new places.

Where Is Your Favourite Place In The World And Why? My favourite place I've been to was the Amazon rainforest, because I saw so many new birds and insects. My favourite place to live is right here in the UK, our climate suits me best!

If You Could Holographically Visit Anywhere On Earth Where Would It Be? I would love to holographically visit the Himalayas.



Ruth

Dr Sebastian Cervantes

Planetary Scientist at the Dublin Institute
for Advanced Studies (DIAS)

What Do You Do? I study tiny high-energy particles trapped around Earth that zoom through space incredibly fast and can sometimes affect satellites and spacecraft. These particles are part of a giant invisible region surrounding our planet that protects us from dangerous radiation coming from space. I also study Jupiter and its moons. Some of them might have deep oceans, huge volcanoes, and maybe even life! I use information from spacecraft to learn what space is like around these worlds and how planets interact with their surroundings. I also use computers to help explore places we cannot visit in person yet.

Hobbies: Hiking, reading, and calisthenics.

Is Your Job Hard Or Dangerous Or Fun? Research can sometimes be challenging because you spend a lot of time solving problems, but that also makes it exciting. It's especially fun when you finally figure something out after working on it for a long time!

What Are The People You Work With Like? The people I work with are curious, supportive, and passionate about science. I get to work with researchers from different countries who all share a love of discovery.

Where Is Your Favourite Place In The World And Why? Anywhere with a dark night sky far away from city lights. I love seeing thousands of stars and remembering how huge and amazing the universe is.



Sebastian

Sophie Butcher

Volcanologist at the British Geological Survey

What Do You Do? I set up very sensitive instruments on volcanoes that measure tiny earthquakes. I then use the earthquake data to understand where magma is inside the volcano, if the magma is moving and when the volcano might erupt.

Hobbies: Running, crochet and any kind of craft really, live music and festivals, hillwalking, swimming, and travelling.

What Inspired You To Choose Your Job? I liked the idea of being a scientist where there was some element of being outside.

What Are The People You Work With Like? I work with some unbelievably brave, determined and talented people who have worked in some really extreme environments, all over the world. I sometimes wonder if people who study natural hazards (volcanoes, earthquakes, tsunamis, floods) are naturally very empathetic, perhaps because they understand the impacts of the hazards they research. I'm very lucky to have always worked with people who are very kind, considerate and collaborative.

If You Could Holographically Visit Anywhere On Earth Where Would It Be? My job is to understand what happens when magma is inside a volcano, just beneath the surface. Why it moves, when and where it moves, and what kind of earthquakes it's causing at the surface. So, I guess if I could just pop inside any volcano I needed to study and have a look at what was going on, that would be super handy!



Sophie

Vanessa Madu

PhD Researcher at Imperial College London

What Do You Do? I create new ways to use maths alongside powerful computers to understand how the ocean moves things and how it will move in the future.

Hobbies: Crochet, figure skating, and crosswords.

What Three Words Would You Use To Describe Yourself? Enthusiastic, clever, and honest.

What Inspired You To Choose Your Job? I love maths, and I love the ocean! I get to use maths to learn about the ocean without having to go there myself. I don't like swimming or boats, but I can still research ocean currents; it feels magical to predict what they will do without ever going out on the waves. It's the best of both worlds to me!

What Are The People You Work With Like? I work with lots of other mathematicians. Most of them don't work on ocean data, but I can still learn from the methods and maths that they use. They're clever and curious, and we have interesting conversations.

Where Is Your Favourite Place In The World And Why? Lough Corrib in Ireland. Standing on the lake pier, there is water everywhere you can see, in the most beautiful way. On a rare sunny Irish day, the sun shimmers on the water, and all you can hear are the small lapping waves.



Vanessa



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