

Eco 
— — —
  

Kids
— — **planet**
 



ADAPTING TO AN ALIEN WORLD



THE WEIRD WORLD OF ANGLERFISH



EXPLORING THE DEEP



Issue 44

PLUS FUN ACTIVITIES, PUZZLES AND EXPERIMENTS!

What's inside this ISSUE



8 Adapting to an Alien World

Living in extreme conditions



12 The Weird World of Anglerfish

Charlie presents...



22 Deep-Sea Sharks

There are some amazing monsters patrolling the deep...



26 Deep-Sea Exploration!

Simon investigates



DIY Jellyfish



Two Posters



For subscriptions, please call
0800 689 1365

Email:
hello@ecokidsplanet.co.uk

Post:
Eco Kids Planet,
41 Claremont Road,
Barnet EN4 0HR
ecokidsplanet.co.uk
facebook.com/ecokidsplanet
twitter.com/ecokidsplanet

Editor: Anya Dimelow

Ecology Consultant:
Olga Denyshchik

Communications Manager:
Emma Oldham

Writers and Contributors:
Gabby Dawnay,
JD Savage,
Katharine Davies

Editorial Assistant:
Jenny Hickman

Design: Nebojsa Dolovacki

Illustrations: Alan Marks
Paper crafts by
Shobhna Patel

All images: © iStockPhoto/Getty Images (unless stated otherwise).

This magazine is printed on FSC certified paper using biodegradable vegetable ink.

PLUS!

3 A Letter from an Octopus

Welcome to the deep sea!

4 Deep-Sea Habitats

Unique ecosystems in the dark depths

14 Giant Squid vs Sperm Whale

Amelia the Fox comic strip



20 Anglerfish

Colouring activity

30 Quiz Planet

Have fun with games and puzzles

32 Over to You

Your letters and creations

34 Testing Water Pressure at Depth

Enjoy this month's science project

35 Deep Rhymes

Enter this month's competition



Follow us on Facebook

www.facebook.com/ecokidsplanet



Follow us on Instagram

www.instagram.com/ecokidsplanetmag

To subscribe, go to
www.ecokidsplanet.co.uk
and sign up for as little as
**£2.85 per month, including
free delivery in the UK.**

A Letter from a Dumbo Octopus

Welcome to my home – the deep, dark sea. A mysterious world which fewer people have dared to visit than space! Yet there's lots of life down here. We are a peculiar bunch of creatures, ranging from zombie worms and flashlight fish to goblin sharks and hagfish! But despite our scary names, we've all adapted in weird and wonderful ways to survive in our deep, dark kingdom. Find out how my friends use bioluminescence, deadly spit, oversized jaws and expandable stomachs on pages 8-11.

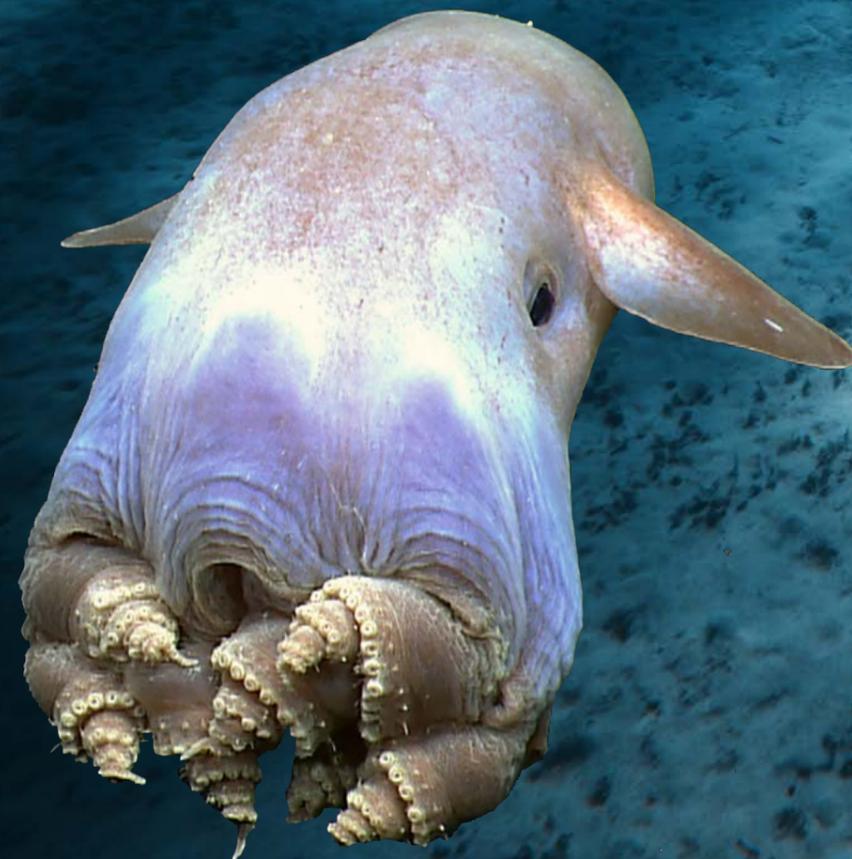
As for me, I'm a small octopus, growing to 20cm high (as tall as a bowling pin). My ear-like fins have given me the nickname 'Dumbo' – named after Walt Disney's famous flying elephant. Using my funny-looking fins, I hover along the ocean floor, pouncing on small prey and covering it with my umbrella-like arms. Unlike other octopuses, I don't have a radula (like a

hard tooth-covered tongue), so I cannot tear my food apart. Instead, I have to swallow prey whole! This means I can only eat small creatures, including crabs, shrimp, mussels and worms. Anything bigger and it might end up stuck!

There's so much to discover in the ocean's depths that we've struggled to squeeze it all into one issue. Explore sea mountains, cold seeps and hydrothermal vents (pages 4-7) and find out about the first humans to delve into the deep sea (pages 26-29).

You can also investigate water pressure (page 34), make your own jellyfish (pages 17-19) and see a mighty battle between a GIANT squid and a sperm whale! (pages 14-15).

Happy reading!
Dumbo



DEEP-SEA HABITATS

All life needs the SUN, right? Er, no!

In the deepest parts of the ocean, there is NO light, hardly any oxygen, and the temperature drops to just 3°C. Plants cannot grow in this cold, watery darkness – but, amazingly, other life thrives here! Scientists now think there are even more species in the depths of the ocean than in all the other environments on Earth put together. Wow! How do they do it?

This is not a place humans can easily visit. In fact, **more people have travelled into space than into the deep!** But new technology means there are now underwater vehicles that can visit places that are impossible for humans to reach...

Let's take a look at some remarkable habitats in the dark depths of the vast, mysterious ocean.

WHALE FALL

That's the name given to the body of a **dead whale** when it sinks to the seabed. These whale **corpses** are usually found in the 'abyssal zone'. Between **2,000 and 6,000 metres** deep, this is **the largest environment on Earth!**

Whale fall is a **fantastic food source** for deep-dwelling marine creatures – **the flesh from a 35-ton carcass** can last for **two years!** And the giant bones become a habitat that lasts for many years after that.

After scavengers have eaten all the whale flesh, the skeleton makes an ideal **house**

for **invertebrates**, such as sea anemones. The anemones live on the bones AND eat the nutrients – a bit like us munching on bricks and wallpaper!

The bones contain **nourishment** for animals like the **ZOMBIE WORM** (eek!). These gruesome-sounding creatures **prefer bones to brains!** But they don't have a mouth or a stomach, so **how** do they eat? They send out tendrils to **EXTRACT** fat from the bones – that's how! But wait, it gets even weirder: only the females eat! Meanwhile, about 100 microscopic males live **INSIDE** the females.



Zombie worm

A **chemical reaction** in the bones makes **sulphide**, a favourite food of mussels, tube worms and many other creatures. This stage of decay can last for up to **50 years**.

As the carcass slowly rots, it enriches the sludge on the ocean bed. What a great fertiliser!

Fun Fact

A single whale skeleton can support **30,000 organisms!**

Vocabulary

- Corpse:** A dead body.
- Invertebrate:** An animal with no backbone.
- Nourishment:** Food necessary for good health and growth.



HYDROTHERMAL VENTS

Geysers are hot springs that blow boiling water into the air. **Hydrothermal vents** are basically **underwater geysers!**

Volcanic activity heats up water to 400°C (scorchio!). The boiling water then pushes through cracks in the ocean bed, **dissolving metals and minerals** on its way. These chemicals form a **solid chimney** as they come into contact with the cold seawater.

Scientists first discovered hydrothermal vents in 1977, in the **Galápagos Rift**, at depths of about 2,500m. Up until that point, **we thought life could not exist without sunlight.**

But life was **THRIVING** around these vents – **HOW** could this happen with no plants around? Plants are at the bottom of the food chain and they need light to live, so without plants, what were these deep-dwelling creatures making energy from? The answer is **hydrogen sulphide**, a toxic chemical that smells like rotten eggs!

This sort of energy production is called **chemosynthesis**.

Hydrothermal vents only last for a few **decades**, so animals living around them grow big quickly. **Tube worms**, for example, can grow up to **two metres** long!

Many other **incredible creatures** live in the area around the vents. **HOW** do they survive in water that is full of poisonous chemicals and gets as hot as 113°C?

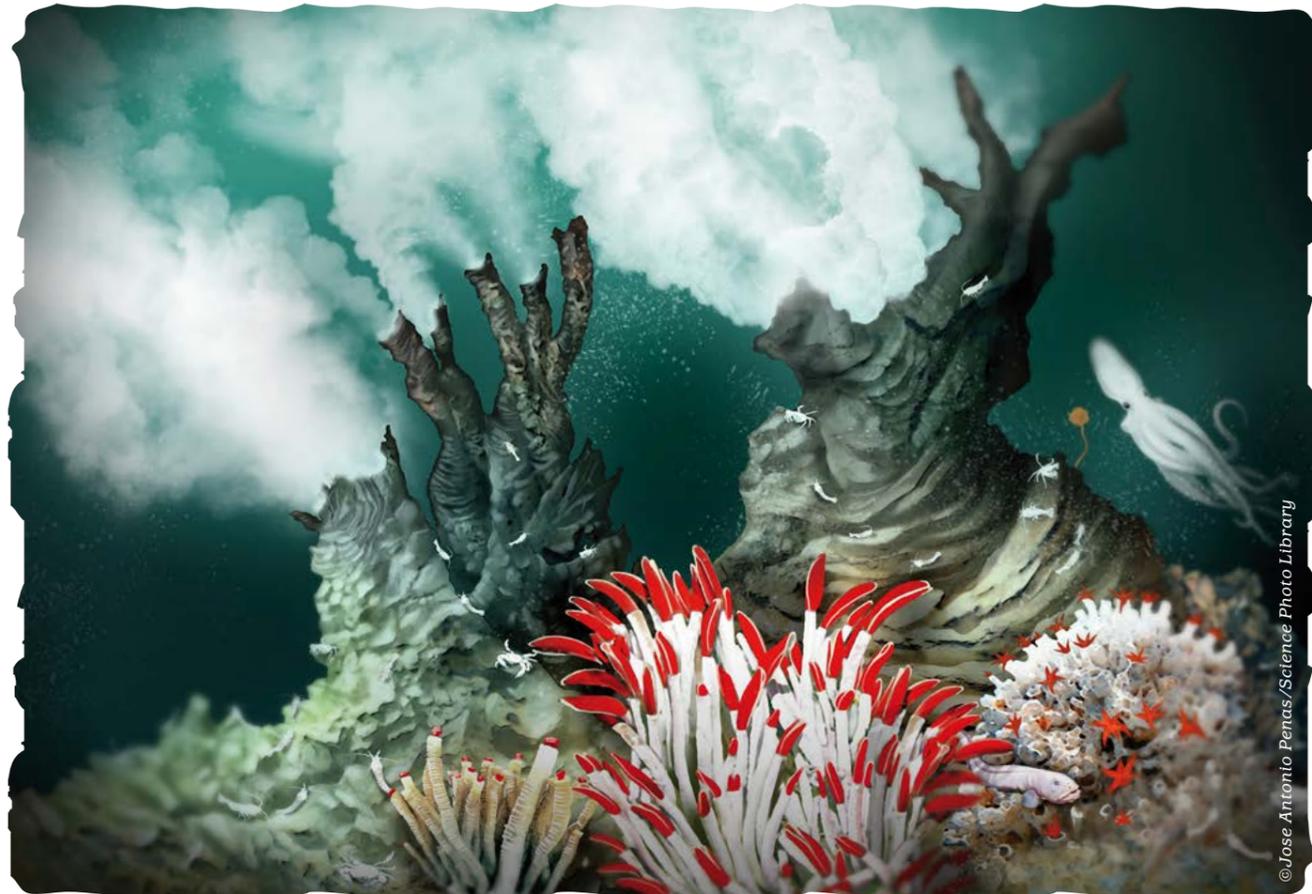
Scientists don't actually know...

But they have discovered that these animals are **closer to prehistoric creatures** than animals that live near the surface. So could this be **where all life began?**

And if life can survive in such harsh conditions on Earth, might there be life on other planets, too?

Fun Fact

Approximately 300 species live around hydrothermal vents, and 95% of these are new to science!



©Jose Antonio Penas/Science Photo Library

COLD SEEPS

When **tectonic plates** move, they make cracks in the Earth's crust. **Cold seeps** happen when chemicals leak out of these cracks into the sea.

They are **similar to hydrothermal vents** but **seeps are not hot.**

Cold seeps last a *very long time*. This means that the animals living around them live a very long time, too. Scientists believe that they are among *the longest-living animals in the world.*

The seep tube worm, for example, can live for **250 years – or more!**



Fun Fact

There are cold seeps all over the world, but the deepest is in the Sea of Japan and is 6,500 metres deep!

Vocabulary

Decade: A period of 10 years.
Tectonic plates: Making up the Earth's outer layer, tectonic plates are like giant pieces of a jigsaw puzzle that move around.



SEAMOUNTS

Seamounts are underwater mountains! When tectonic plates collide and lava erupts through the cracks, it hardens into **magma** to form volcanoes and mountains.

Scientists think seamounts cover more of Earth's surface than *all the other dry land habitats added together.* There are approximately **100,000 seamounts** in the oceans across the world.

The highest mountain in the world is a seamount. It's in Hawaii and is called **Mauna Kea.** **At over 9km tall,** Mauna Kea is **even taller than Mount Everest,** which is around **8.8km tall.**

Scientists only discovered the existence of seamounts in 2000. So they are an even newer find than hydrothermal vents!

Known as **underwater oases**, the sides of these mounts are a firm surface for underwater creatures to cling to. **Crabs, sea lilies, corals and brittle stars** attach themselves to the mounts, creating even more complex textures where more creatures can live.

Food is plentiful because currents of water swirl around them, moving nutrients and minerals up from the deep. Some peaks of the mounts push through the surface of the sea into the sunlight. Others remain unseen in the depths of the ocean.



Sea star on coral on a seamount

Fun Fact

Over 1,300 species live on seamounts and many are unique to each mount, like individual islands.

Adapting to an

ALIEN WORLD!

The deep sea is a harsh world, but many creatures have adapted to it perfectly, often in the weirdest of ways...

Let's look at the challenges of living there. Firstly, there's no sunlight, so it's always as dark as the blackest night. Secondly, the pressure is intense and crushing. Thirdly, it's extremely cold – all year round! The further down you get, the less food there is, and it gets harder to find a mate. It really is an alien world, so it's no surprise that many of its creatures look as if they're from science-fiction movies – or even horror films!

Many have body temperatures close to that of the surrounding water. In other words, very, very cold. Brrrrrr!



©Nature Picture Library/Alamy Stock Photo

Deep-sea smelt

Dark depths

Sunlight doesn't travel far in the ocean. It may penetrate about 1,000 metres down if the conditions are right, but even that's rare. You don't have to go too deep to find a world of complete darkness. Some of the fish living there have **big, tubular eyes**, to help them find the maximum amount of light in one direction. Some are totally blind and rely on touch and chemicals to help them survive and reproduce. Some have an incredibly strong sense of smell to help them find food.



©Solbin Zankl/Alamy Stock Photo

Pacific hatchetfish

Fun Fact

The deep-sea environment is so stable, many of its creatures have hardly changed since their early ancestors, millions of years ago!

That coldness gives them a very slow metabolism. That's the chemical process in their bodies that uses food for energy and growth. The hagfish's metabolism is so slow it can go seven months without eating! That means they don't need to find much food, which is handy, because meals can be few and far between!



©Brandon Cole/naturepl.com

Pacific hagfish

Some fish, such as viperfish, can open their jaws very wide, and extend their stomachs to eat victims up to four times their own size! That should fill them up for a good while. But can you imagine gulping down something four times bigger than yourself?

Fun Fact

Viperfish get their name from the long fangs that stick out from their upper and lower jaws – just like the snake!



Illustration by Else Bostelmann

Saber-toothed viperfish

Some fish don't waste energy swimming around looking for food... They've adapted to be sensitive to even the tiniest vibration, so they stay still, until something brushes past them... then they grab it! They often have big mouths with sharp teeth, to stop their prey squirming away.

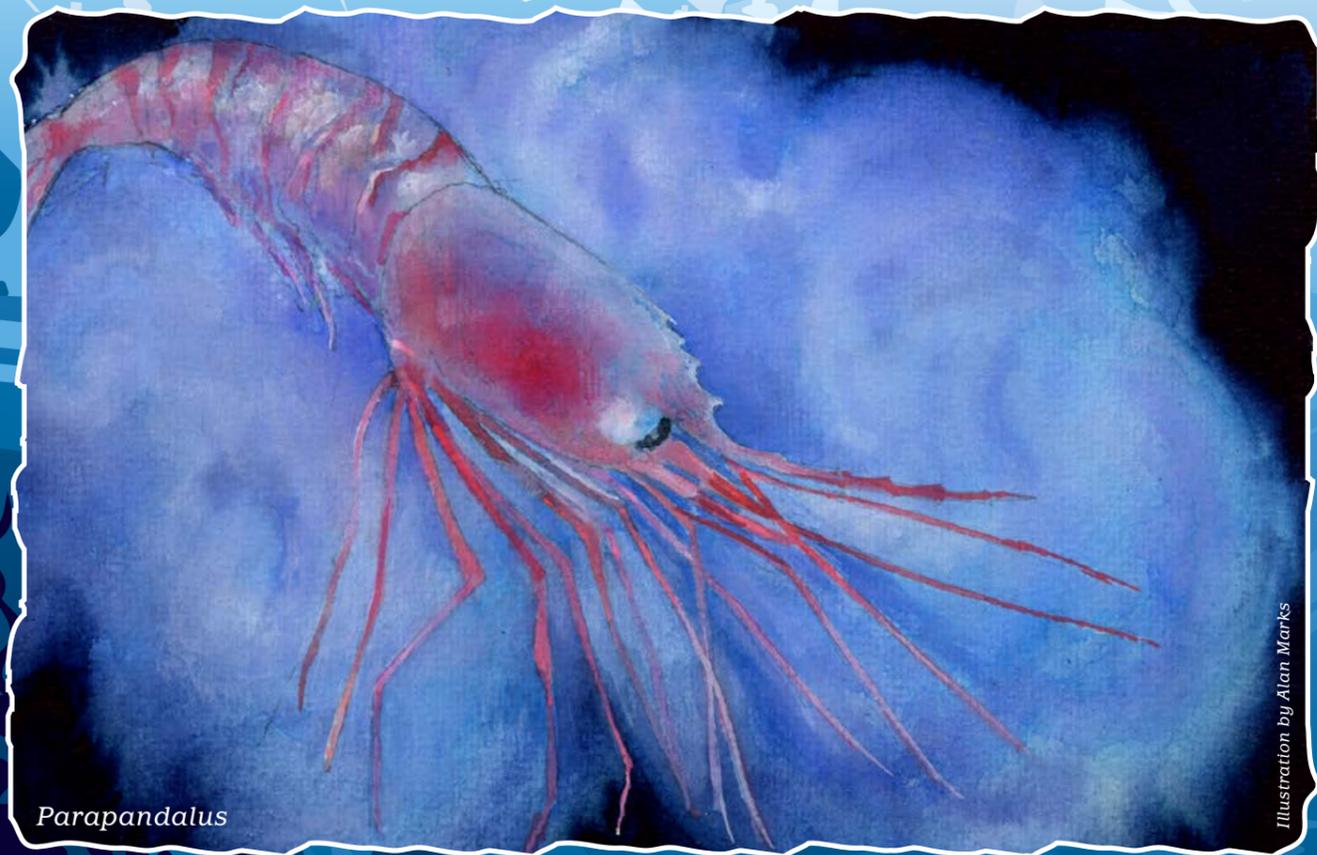
Lighting up the ocean

Despite the darkness, there is light in the deep-sea world. It comes from the creatures themselves! Many are bioluminescent (pronounced bi-o-lum-in-ess-ent), which means they can create light. For example, **flashlight fish** have light organs under their eyes, which can be turned on and off by blinking – just like a torch or flashlight! These bright cheek lights move swiftly through the darkness, helping the fish find something yummy to eat.



©Minden Pictures/Alamy Stock Photo

One-fin flashlight fish



Parapandalus

Illustration by Alan Marks

Green bomber worms can throw out some of their body parts, like light bombs. They create a brilliant green display, to scare off predators. And how's this for defence? If a predator disturbs the deep-sea shrimp known as parapandalus, the shrimp vomits a glowing cloud at it! Now that predator is 'wearing' that colourful sick, it's no longer hidden in the dark, so it dashes away before an even bigger predator can spot it. The shrimp gets to survive another day!

Tiny creatures called ostracods do something similar. If a fish swallows one,

it turns on its bright light, which makes the fish stand out to predators. The fish quickly spits the ostracod out – and it's the most beautiful spit you've ever seen, like a blue laser! They also use their lights to attract partners, like many other bioluminescent creatures. Others, such as anglerfish, use their lights like bait, luring prey straight to their mouths!

Heat on the sea floor?

Some truly bizarre creatures live at the bottom of the ocean. However, we used to think there could be no life there at all. There's hardly any food, it's surely too cold, and the pressure is powerful enough to crush metal! Then, in 1977, we made an amazing discovery on the Pacific Ocean floor. Scientists discovered a strange desert world there, with what looked like chimneys belching out clouds of smoke!

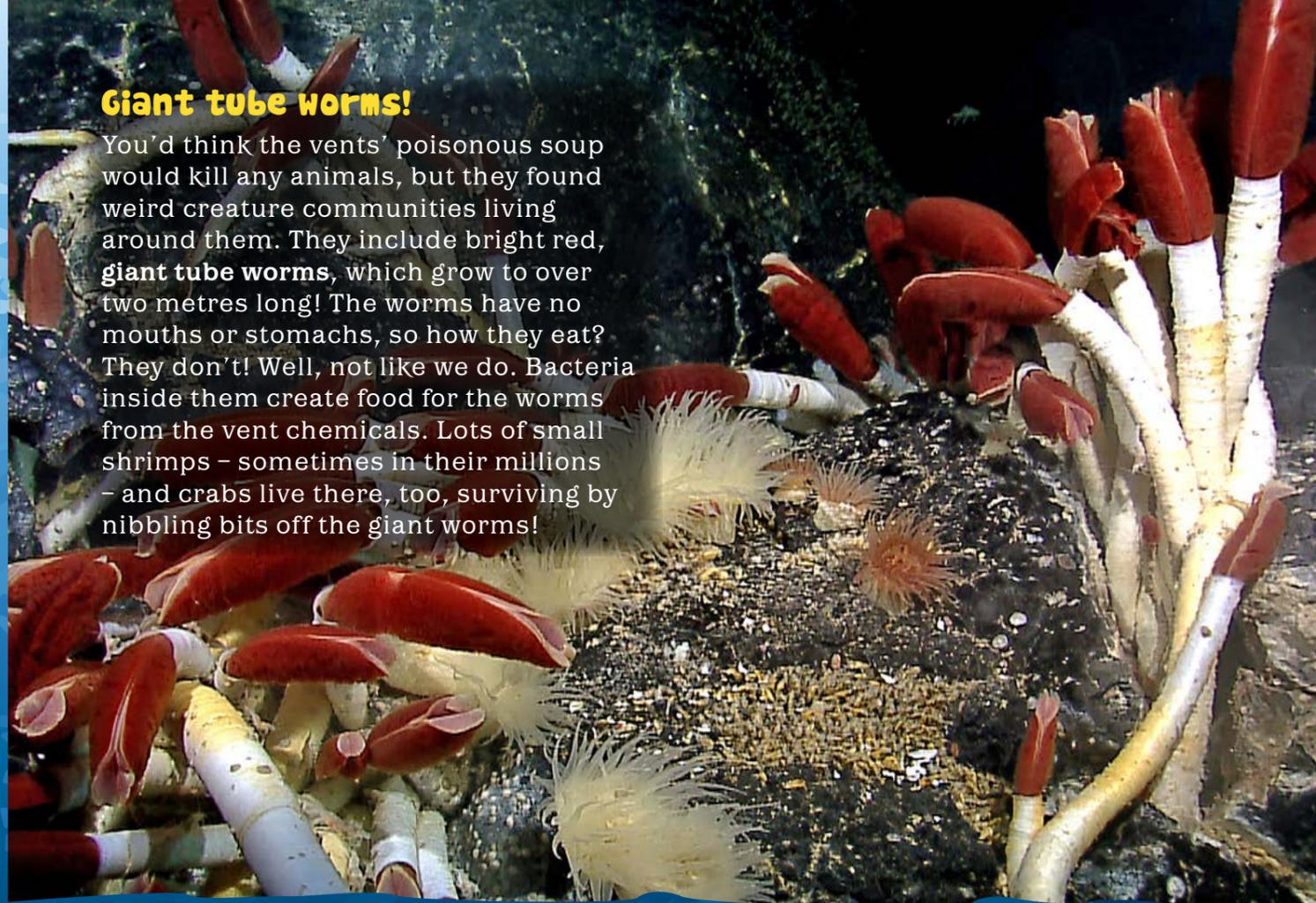
They were hydrothermal vents, powered by volcanic heat. (You learned about them on page 6!) Now we knew it wasn't always freezing down there!



Ostracod

Giant tube worms!

You'd think the vents' poisonous soup would kill any animals, but they found weird creature communities living around them. They include bright red, giant tube worms, which grow to over two metres long! The worms have no mouths or stomachs, so how they eat? They don't! Well, not like we do. Bacteria inside them create food for the worms from the vent chemicals. Lots of small shrimps – sometimes in their millions – and crabs live there, too, surviving by nibbling bits off the giant worms!



Under pressure

Imagine having the **weight of the ocean** hanging over your head! You may wonder how deep-sea creatures cope with it. Some fish have swim bladders like lungs, filled with gas that's at the same pressure as the surrounding water. That controls floating in the water. Tiny molecules inside them called TMAO also help them to adapt. There are also **flat creatures** like **rays**, which lie on the ocean floor, hiding under the mud, digging up little creatures to eat.

It all makes you wonder what other bizarre creatures lurk down there. Sadly, it's hard to find out. Organisms living close to the sea floor are very hard to visit, so they're difficult to sample and study. Who knows what creatures we've yet to discover – and in what strange ways they've adapted to this alien world?



Monkfish with its huge mouth and flat body

Fun Facts

At the deepest part of the ocean, the pressure is like having **100 elephants** standing on your head. Ouch!

Charlie Presents:

The Weird World of Anglerfish!



Hi, I'm Charlie, the Eco Kid who can talk to animals. The fish I'd most like to chat with is the deep-sea anglerfish, but bringing a live one to the surface would be really hard – and there's no way I'm going down into its dark world! You know why I want to meet one? To ask it whether it's as angry as it looks! Well, I'd be pretty angry if I looked like that...

Luminous lure

The anglerfish lives in a very dark world, usually between depths of 400 and 2,000 metres. But it's not the dark that creatures living down there should be afraid of. It's the **light!** Some of the bright things in that zone are **bait**, luring them towards some very sharp teeth indeed.

Look at that glowing 'light bulb' dangling over the female anglerfish's mouth. It hangs on the end of a long piece of spine, acting like bait on a fishing rod to attract prey towards its big mouth. That's how the fish got its name – 'angler' is another word for 'fisherman'.



Deep-sea anglerfish

And if the prey is bigger than itself? No problem! The anglerfish can open its oversized jaws even wider, and its stomach expands, so it can snap up creatures twice its own size. Its long, backwards-pointing teeth stop them escaping. Well, there's so little to eat down there, they can't let a meal wriggle free!

The spooky glow comes from **bioluminescent bacteria** living in the anglerfish's esca. That's the name of the fleshy bulb at the end of its 'fishing rod'. The bacteria get protection and nutrients from living there, and the anglerfish makes use of their light. We're not sure how they get there – deep-sea anglerfish are very difficult to study! We hardly ever see them alive in their natural environment, and they don't stay in good shape when they're dragged to the surface.

It's not just its looks that are weird...

The females can be as big as footballs, but the males are completely different. They're not bioluminescent and they're quite tiny – but their noses are big and powerful enough to detect a chemical that the female releases. That flashing esca helps them to find her, too!



Male anglerfish attached to a much larger female

When they do find a female, they bite down hard on her belly, and latch on until they've **fused** with her body and bloodstream. Now that their skin and blood vessels have joined, the male can take all the nutrients it needs from the female's blood. It no longer needs to bother with swimming or catching food. After a while, it loses most of its internal organs, along with its fins, teeth and eyes! A female anglerfish can carry at least eight males around on her body.

Deep-sea anglerfish are hardly ever caught on camera, but in 2016, a unique video clearly captured a mating pair. The female is from a very rare species, and she's surrounded by whisker-like fin rays, spreading out through the water. They seem to glow with light – though they could just be reflecting the glow from the vessel they were being filmed from. It might be fanning its rays out like a net to help it detect movement and catch food – or maybe it's to make the anglerfish seem bigger, to scare off predators. The amazing footage can be found online.



Source: Rebikoff Foundation.

Fun Fact

There are over **200 species** of anglerfish!



I used to find anglerfish freaky and scary-looking. Now I find them fascinating – and want to chat with one more than ever!

AMELIA THE FOX

GIANT SQUID VS SPERM WHALE
by RICHY K. CHANDLER

THE SOUTH PACIFIC OCEAN

HMM... I SHOULD BE MEETING MY FRIEND SAUL FOR A CATCH-UP. WHERE IS HE?

AMELIA! OVER HERE!

THERE YOU ARE! WHY SO NERVOUS?!

I'M TRYING TO STAY HIDDEN! PRETTY SURE THERE'S A SPERM WHALE NEARBY!

IS THAT ALL?!

YOU SHOULD BE ABLE TO HANDLE YOURSELF, RIGHT?!

I'VE HEARD OF THE LEGENDARY FIGHTS BETWEEN GIANT SQUIDS AND WHALES! TWO HUGE BEASTS TAKING EACH OTHER ON!

WELL, THAT'S KIND OF JUST MYTH! SPERM WHALES' STOMACHS ARE FULL OF OUR BEAKS!

EW!

WE'RE NOT GOING ROUND PICKING FIGHTS WITH WHALES! WE'RE JUST FOOD TO THEM!



OH NO! THE WHALE IS TWISTING!

THAT SEEMS TO BE SUCKING SAUL INTO ITS HUNGRY TEETH!

YUM!!!!

IT'S ALL OVER FOR ME! TELL THE WORLD MY STORY, AMELIA!

"PLUS THEY USE SONAR TO TRACK US DOWN!"

"OH MY! WHAT CAN YOU DO?!"

WE STAY ALERT! OUR 28cm EYES ARE THE BIGGEST ON THE PLANET! WE CAN DETECT LARGE HUNGRY MONSTERS FROM 120 METRES AWAY!

THIS IS HANDY, BECAUSE IF THEY CATCH US...

...IT'S NOT A FAIR FIGHT!!!

SLASH!

OUCH!

SWIPE!

HEY!

THANKS FOR THE TIP, AMELIA!

NO WORRIES, MY FRIEND!

DON'T TELL ANYONE ABOUT THIS! I HAVE A REPUTATION!

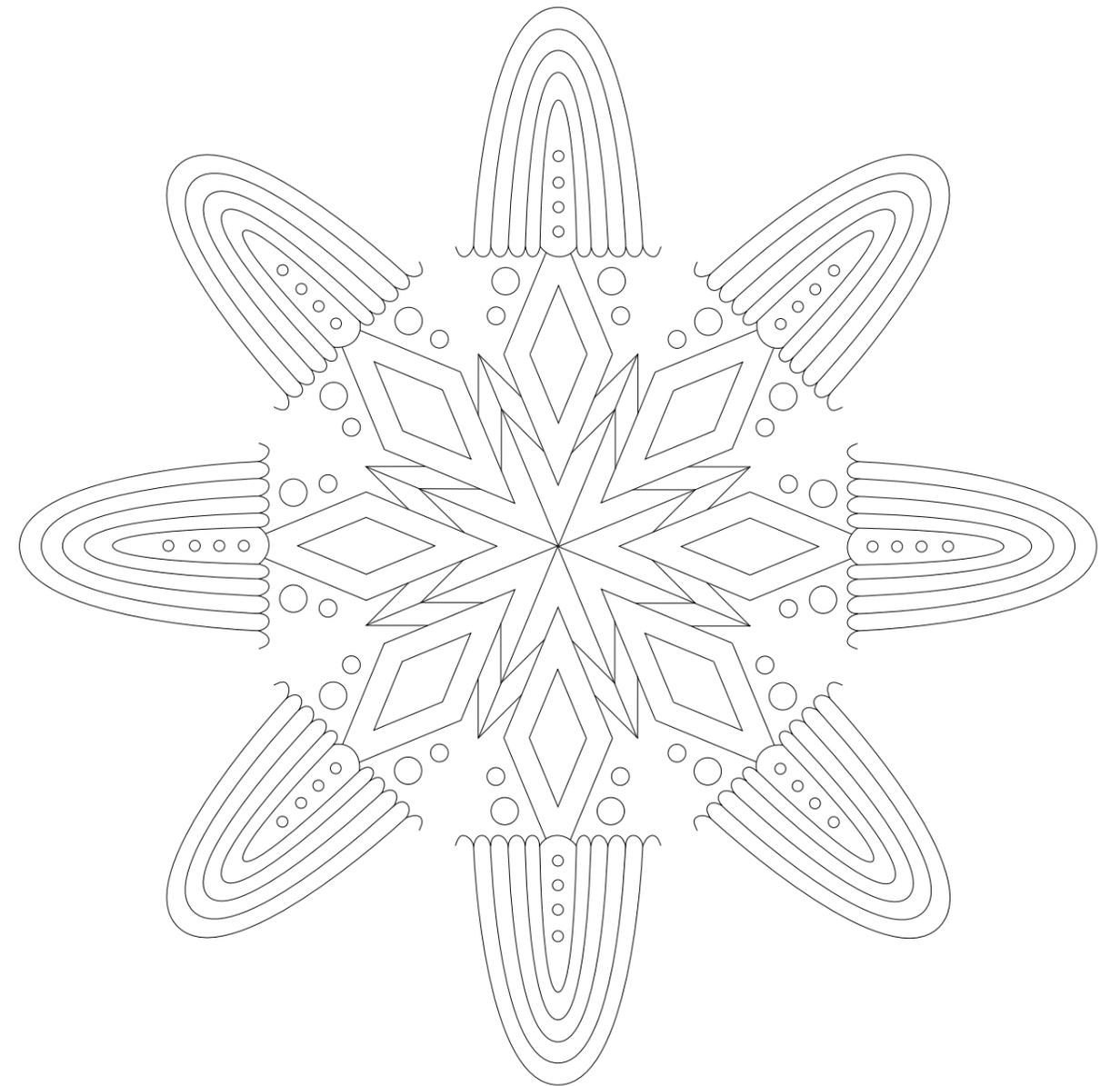
Richy

Pink Helmet Jellyfish (*Aglantha Digitale*)

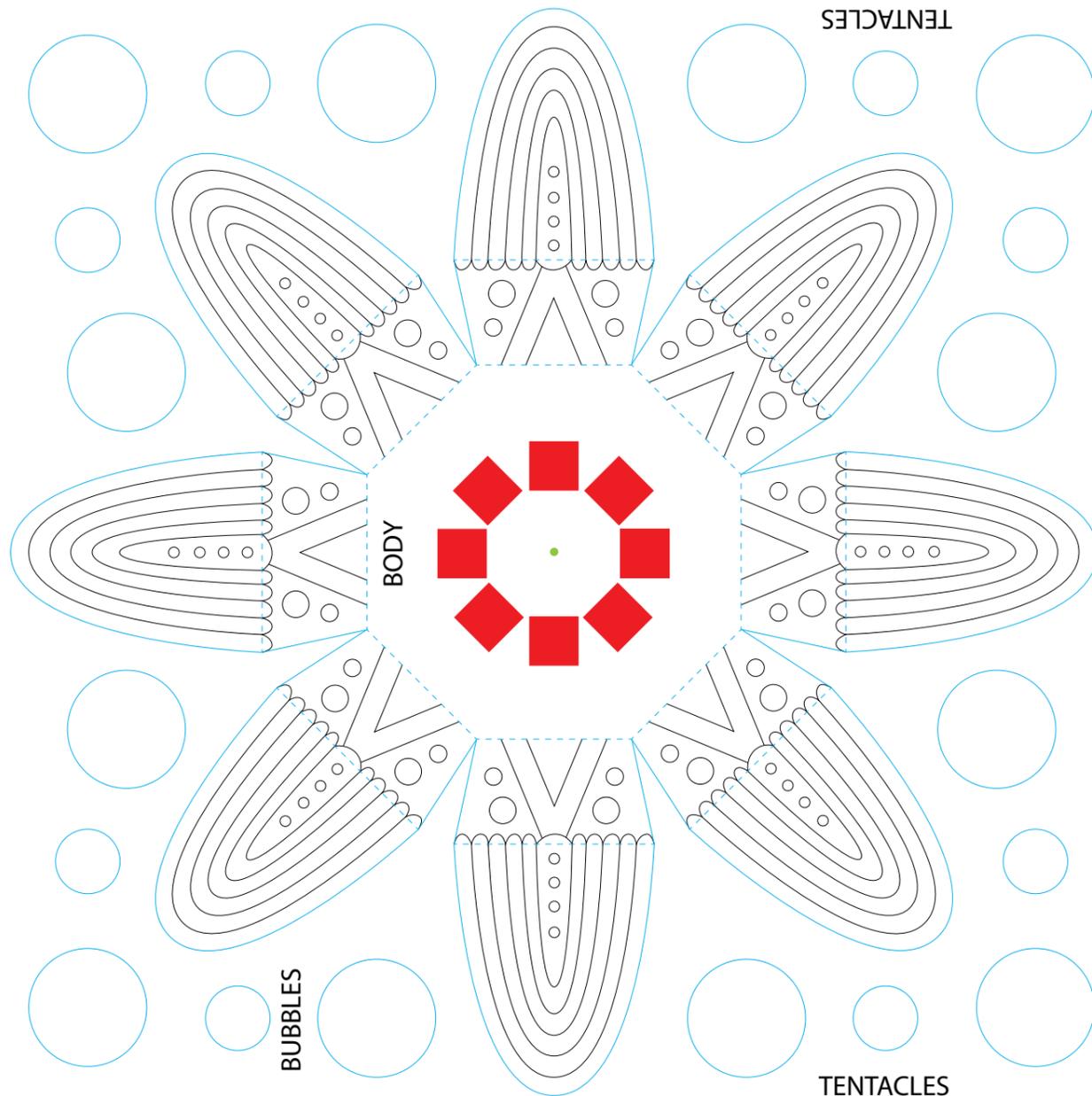
Arctic Ocean



Aglantha digitale, also known as the pink helmet, is a spectacular jellyfish that lives in the Arctic Ocean. Jellyfish are ancient gelatinous animals that have been drifting through the oceans since even before dinosaurs.



Make Your Own Jellyfish



Things you will need:

- Colouring pencils or felt-tip pens
- Scissors
- Double-sided sticky tape or a glue stick
- A 30cm thread
- A skewer or cocktail stick (ask an adult to help you)

Paper techniques involved:

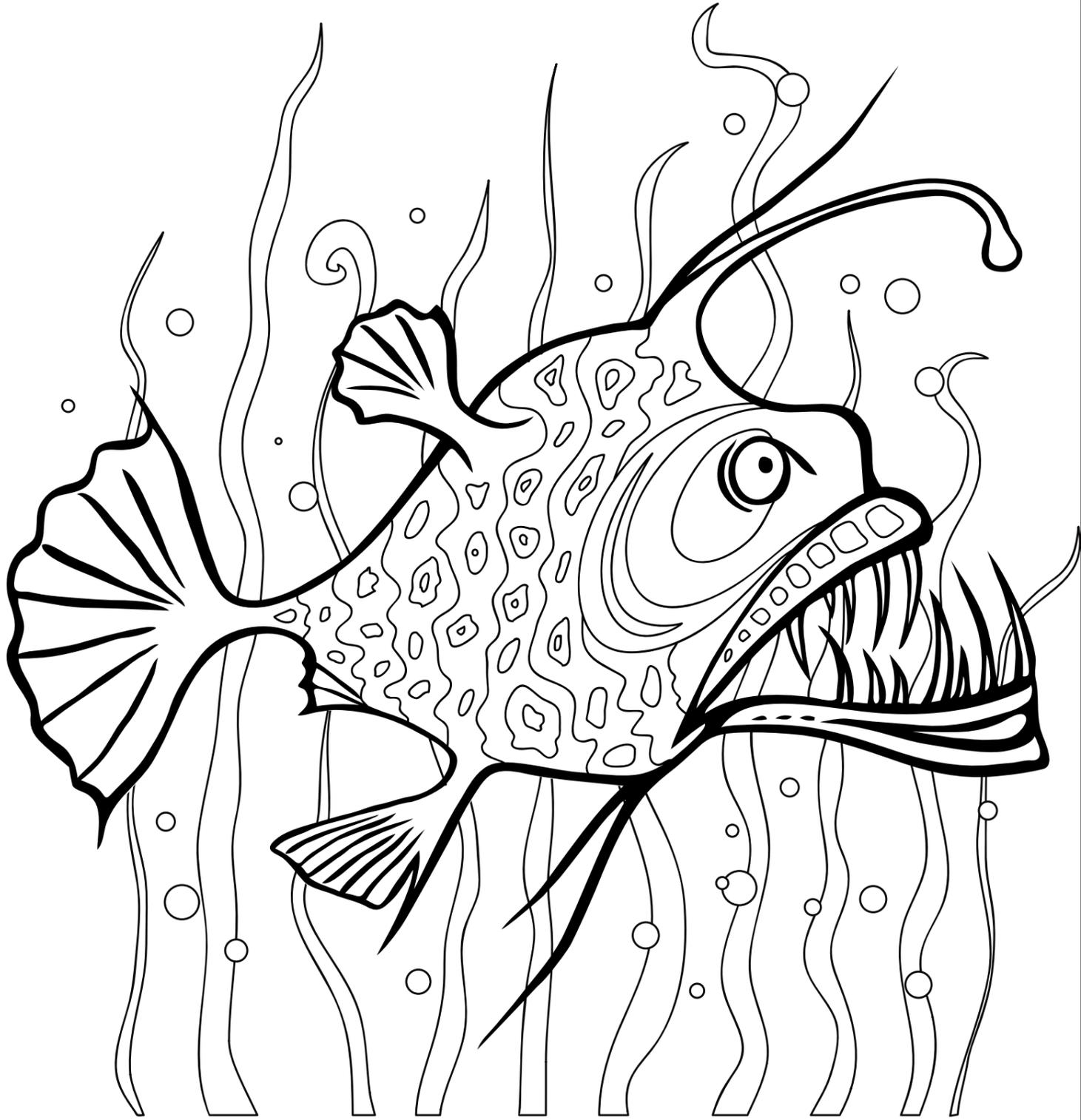
Curling, pleating, controlled tearing.

1. Working on the tentacles first, slowly and carefully tear along the solid red lines in a straight line using your fingers, to create eight tentacles. (This method is called 'controlled tearing'.) Don't worry if you go wrong and are left with fewer tentacles than this!

2. Next, cut out the bubbles and body of the jellyfish, ensuring you only cut along the solid blue lines. Then colour them in, including the tentacles.
3. Working on the body of the jellyfish, fold along all the dotted lines. Make sure you fold towards you (side A should go on the inside of the jellyfish once it is constructed).
4. Using a technique called 'curling', curl each of the long flaps of the jellyfish's body. To do this, use the tips of your thumb and forefinger to gently pinch at the bottom of the flap and work your fingers upwards. Use your other hand to hold down the rest of the jellyfish's body. Repeat this two or three times and you will notice the flaps will have curled a little.
5. Poke a hole through the central green circle of the jellyfish, using a skewer or cocktail stick. Ask an adult to help you.
6. Make a knot at one end of your thread and then pull the thread through the hole. The knot should remain inside the jellyfish. You can use this to hang up your jellyfish once it is completed.
7. Grab the tentacles you created earlier. Working on one tentacle at a time, begin to fold it forwards and backwards into a zigzag, almost as if you are creating a spring. (This method is called 'pleating'.) Repeat this step with all the tentacles.
8. Fold along the dotted lines at the top of all the tentacles. Apply double-sided sticky tape (or glue) to the red squares at the top of all the tentacles. Stick these into place on the red squares on the underside of the jellyfish.
9. Stick the bubbles you cut out earlier on to the jellyfish wherever you like. You can even use the bubbles to hide parts of your thread. To do this, you need to use two bubbles the same size and stick them either side of the thread.

Voila! You have completed your jellyfish. You can hang it up in front of a window or from the ceiling (you will need a longer thread for this). Watch as it moves when you walk past!

Anglerfish



Eco Kids planet

Cockatoo Squid
Gulf of Mexico



The cockatoo squid, also known as a glass squid, lives in the depths of the ocean. Its body is filled with ammonia (a colourless gas), which gives it a balloon-like shape and helps it float. It has large eyes and a transparent sac-like body. Special light-emitting cells located under its eyes help the squid to be camouflaged, by cancelling out its shadow.

Deep-Sea

SHARKS

There are some amazing monsters patrolling the deep...

Each of these sharks has adapted to the cold, dark depths of the ocean. None of them is dangerous to humans – nor are you likely to ever meet one, other than in your 'deepest' nightmares!

A couple of these sharks have bits that **GLOW IN THE DARK** (SPOOKY!) and they are all **ovoviviparous**. This means the eggs hatch INSIDE the mother, who gives birth to live young.

Let's have a closer look at these strange, striking and spectacular SHARKS!

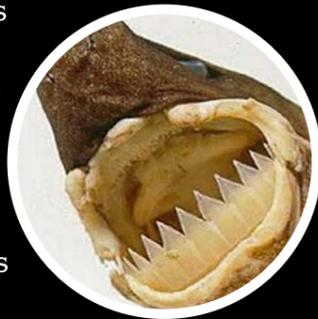
COOKIECUTTER SHARK

Mini spinning scary muncher!

LOOKS: A bit like a large cigar in shape and colour! The underside of the shark **GLOWS**. This is because of **light-creating organs** in the skin called **photophores**.

SIZE: Not very big! Males grow to approximately **41cm**, and females to **55cm** – that's about the size of a chihuahua!

GNASHERS: Seriously fierce. **On the bottom jaw**, they have **25-31** rows of teeth. Instead of losing the odd tooth here and there, cookiecutters **lose the entire set at once**. Actually, they **SWALLOW** them to absorb the calcium. (EEEEK!) **On the top jaw**, they have **30-37** rows of small, triangular, uniform teeth.



FOOD & HUNTING: (GULP!)

Cookiecutters eat tuna, stingrays, seals, whales, dolphins and other sharks. To be more accurate, they take a bite out of them and move on... They are the only species of parasite sharks!

Their large lips and mobile tongues form a vacuum on the surface of the victim. Then they spin their bodies to remove a plug of flesh, leaving behind a **wound that's 5cm wide and 6cm deep**.

They use bioluminescence to blend in with the moonlight and lure prey up from the deep. They can even flash like **strobe lighting!**

WHERE? Cookiecutters are found in deep warm coastal waters around islands near the equator.

SUPERPOWER: Surely their unusual feeding method? **Cookiecutters** get their name from their cookiecutter-like action and the wounds they leave on their prey!

GOBLIN SHARK

Mysterious sword-headed snaggle-toothed slow swimmer!

LOOKS: Often called 'living fossils', this is one **creepy-looking** shark!

- It has an **extraordinary snout** that sticks out of the top of its head like the blade of a sword.
- It is **PINK** because its blood vessels are close to the surface of its **transparent skin**.
- It has **extending, moveable jaws**, adding to its unusual appearance.
- And a **thin body**, which is soft-skinned and flabby-looking, due to underdeveloped muscles.

SIZE: Goblins are medium-sized sharks. **Adults** measure **3-4 metres** (that's big enough!) and weigh around **200-210kg**.

GNASHERS: Teeth are pin-like, extra sharp and pointy, set in **delicate, soft jaws**. The upper jaws contain **35-53** teeth, while the lower jaws contain **31-62**.

FOOD & HUNTING: Goblin sharks eat fish, crabs, cephalopods, squid and, er, rubbish.

Having under-developed muscles, they are **not fast or skilled swimmers**, but they have evolved another way to catch their prey: **ambush!**

They lurk on the ocean floor and creep up on their prey, grabbing it in their extendable jaws!

WHERE? They live **1,300-1,400 metres** deep. **Sightings** are rare because these sharks live at such great depths, but they have been spotted in New Zealand, South Africa and Madeira. **50%** of the population appears to live in the waters around Japan.

SUPERPOWER: The rubbery snouts of goblin sharks are covered with **ampullae of lorenzini**. These are *special sensory organs* that help them to detect prey.



© Rob Zugaro/Museums Victoria

© David Shen/SeaPlex.com



MEGAMOUTH SHARK

Shy luminous-lipped big mouth!

LOOKS: A massive blunt head, gaping mouth and huge jaws – the megamouth’s name describes it perfectly! (Its head is actually bigger than its body!)

Like the goblin shark, it has **underdeveloped** muscles and a flabby body. It also has a slightly protruding jaw, making it look like a prehistoric fish. But very little is known about these gentle giants – only **100** individuals have ever been seen!

The megamouth shark was first discovered in **1976** by a US Navy research ship. Scientists realised that the huge fish tangled up in wires was something special. It was a **completely new shark species!**

It even has its own genus: *megachasma*, meaning *massive, massive hole*.

SIZE: Up to **7.62 metres** in length (that’s slightly bigger than a great white shark).

GNASHERS: **50 rows** of teeny-tiny teeth on each jaw, but **only three rows** are used.

FOOD & HUNTING: Megamouth sharks are **filter feeders**, like basking and whale sharks. But they are not nearly so good at swimming, thanks to their poor muscle tone.

They are **vertical migrators**; they **dive down into the abyss** following plankton by day. Then they follow them back up again into shallower waters at night.

WHERE? Megamouths are also known as ocean-hoppers. They travel between the depths and shallows of the Indian, Atlantic and Pacific oceans in search of food.

SUPERPOWER: The megamouth has **bioluminescent lips**. It uses these suckers to attract plankton in the dark waters of the deep!

GREENLAND SHARK

Longest-living megalith of the deep!

LOOKS: Ancient, massive and *almost* cute-looking, for a shark! This is due to **no visible teeth** in its relatively small mouth. It has brown, black and grey flecked skin, with dark lines and white spots, and pointy teeth-like ‘**denticles**’ cover its whole body.

It is also known as a sleeper shark because of its **slow, sluggish** movements. (*BUT that’s not such a bad thing – see ‘SUPERPOWER’ below...*)

SIZE: **HUGE!** At **7 metres** long and weighing **one ton**, the Greenland is one of the largest shark species.

FOOD & HUNTING: These scavenger sharks eat **ANYTHING!** Fish, seals, crustaceans, squid, sea birds and carrion, such as whale meat. Scientists have even found bits of horses and entire reindeer in their stomachs!

WHERE? The Arctic and Atlantic oceans; Norway, Canada, Ireland, Iceland and, of course, Greenland.

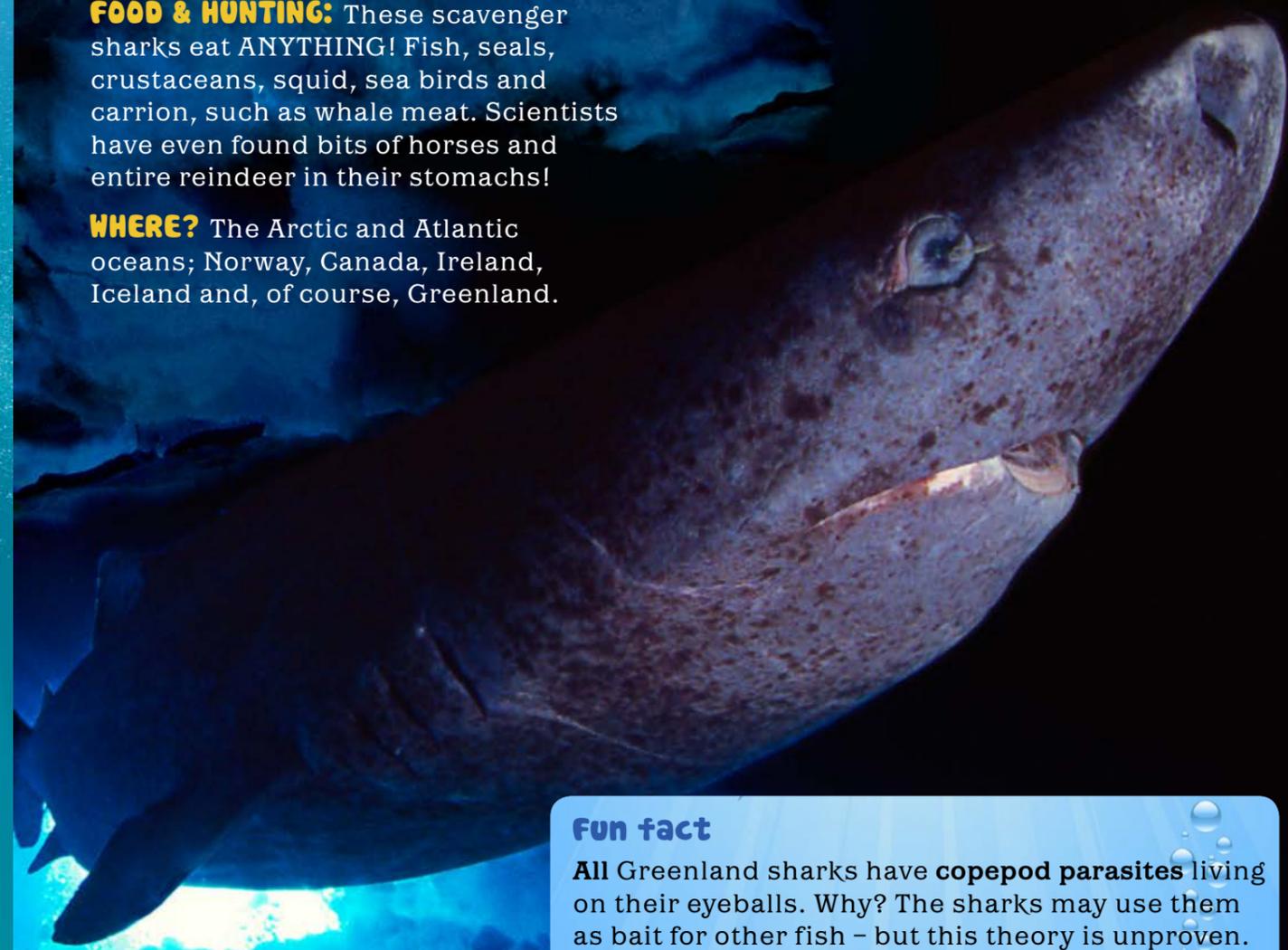
Greenland sharks migrate but seem to **prefer colder waters**. They are the **only sharks** that can live in the Arctic all year round.

And they go deep, swimming to depths of **2,200 metres**.

SUPERPOWER: The Greenland shark is the **longest-living vertebrate** on the planet. **On average, they live for 400 years!**

HOW? Greenland sharks have **extremely SLOW metabolisms**. This helps them to cope with the extreme cold of the deep ocean. This shark’s heart beats just once every 12 seconds.

For the Greenland shark, sluggishness means survival!



Fun fact

All Greenland sharks have **copepod parasites** living on their eyeballs. Why? The sharks may use them as bait for other fish – but this theory is unproven. The **copepods**, of course, damage the sharks’ sight after a while, but they don’t need great eyesight when they spend most of their time in darkness.

Deep Sea Exploration!

I wanted to find out when we started exploring the deep sea – and what we expected to find there!



What's down there?

The sea must have seemed **seriously** scary a few hundred years ago. After all, sailors sometimes saw strange, monstrous creatures rise to its surface! There was no way of seeing into its depths to know what **else** lurked down there.

It surprised me to discover that many scientists believed there was **no life at all** in the deep-sea world! There was no light, they thought, so no plants could grow – and no plants means no animal life. The temperature drops to almost freezing, and

the lung-crushing pressure would be too much to bear. So they thought the ocean floors were dark deserts: flat, lifeless and boring. Boy, were they wrong...

Fun Fact

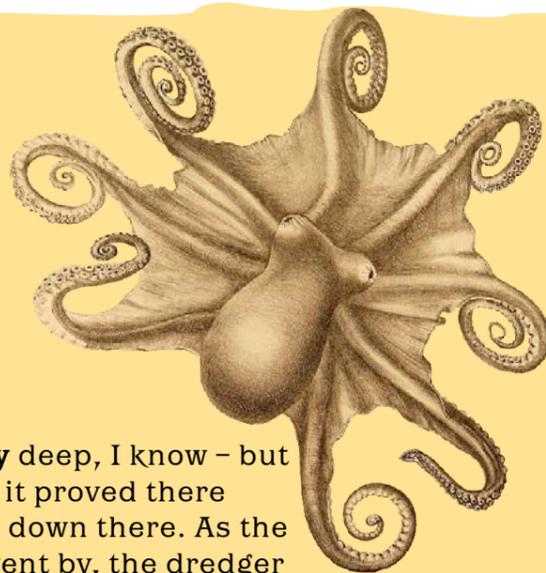
Scientists know more about the far side of the moon than they do about our ocean depths!

Case Notes: The First Seabed Digger

The first marine biology dredge was designed by Otto Friedrich Müller in 1830. It was a net with a digging device that could scrape the ocean floor and catch forms of life – if there **were** any! But the dredge couldn't close, so the samples fell out when it was pulled back to the surface. Looking at the empty dredge, people carried on thinking there was no life down there. Epic fail!

Sir Charles Wyville Thomson improved the device for a deep-sea dredging expedition in the North Atlantic in 1868. Now it **could** close, and collected lots of sponges, molluscs and other organisms from 300 fathoms (about 550 metres) deep. Still

not **very** deep, I know – but at least it proved there **was** life down there. As the years went by, the dredger got dropped to deeper and deeper levels. By the end of 1876, Sir Charles had discovered **4,417 new species** of marine organisms. Result!



Sending humans down!

Some scientists wanted to see the ocean floor for **themselves**. There were early **submarines** made as long ago as 1623 and 1800, but they couldn't go very deep at all. **Diving bells** seemed our best bet for visiting that weird deep-sea world. William Beebe and Otis Barton built the **bathysphere** in 1930. It was a hollow, steel ball to lower into the sea on a cord... with humans inside! It had three small portholes to look out through, and oxygen flowing from two tanks. At first they were only lowered to 400 metres, off the coast of Bermuda, but imagine how claustrophobic and creepy it must have been!

The duo kept improving the bathysphere and went on 35 dives into the deep over the next four years. By 1934 they were reaching depths of nearly 923 metres, and the bathysphere now had one big window. They had to use a powerful light to observe all the freaky creatures swimming past it. There were no cameras capable of taking photos of the deep-sea life, so the pair could only describe what they saw. But some people said they were just hallucinations, or that they were lying, and hadn't seen **anything at all!**



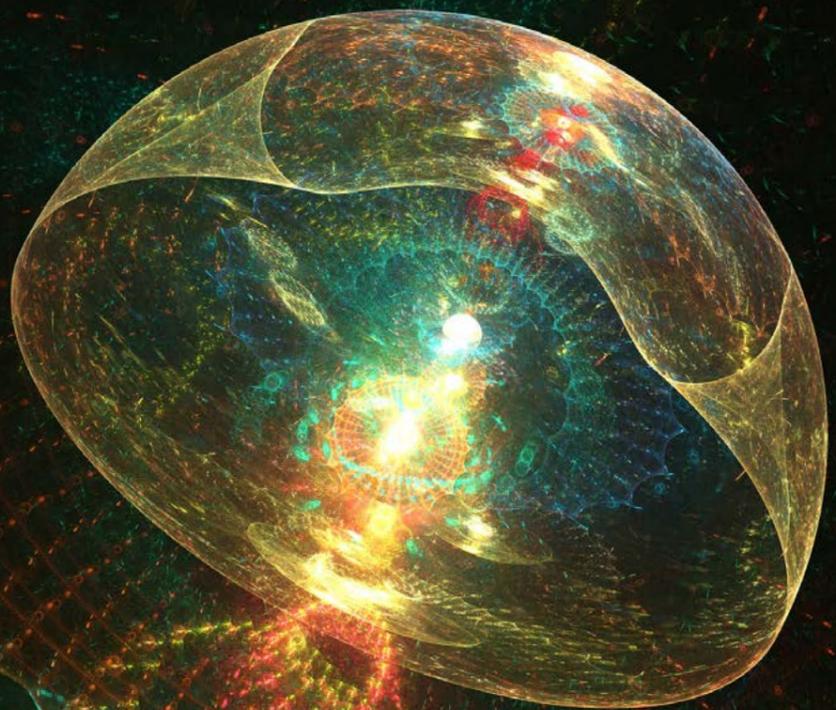
Professor Beebe in his bathysphere, 1km below the surface of the Atlantic Ocean, 1932

Fun Fact

Oceans cover 71% of our planet – but we've only explored about 5% of them!

In time, we discovered that we'd been wrong about many things.

Thermal vents on the ocean floor shoot out hot water that attracts marine life. They provide light and heat from magma under the planet's crust. So it's **not** all darkness and cold down there. Another big surprise was that many deep-sea creatures are **bioluminescent**, providing their own light. We began to realise that the deep sea was a **treasure trove of weird animals!**



The Mariana Trench

The **Mariana Trench**, in the Western Pacific Ocean, is the deepest part of the world's oceans. Its very deepest point, **Challenger Deep**, is the deepest point on the entire planet. You could even drop the world's highest mountain, Mount Everest, into it – though don't ask me how! If we did, there would still be 2,146 metres of seawater above Everest's 8,848-metre high peak.

Gloaked in complete darkness and faced with incredible pressure, the trench must be one of the most inhospitable places on Earth. Have humans been down there? You bet!

Fun Fact

The first useable diving suit was invented in 1837!

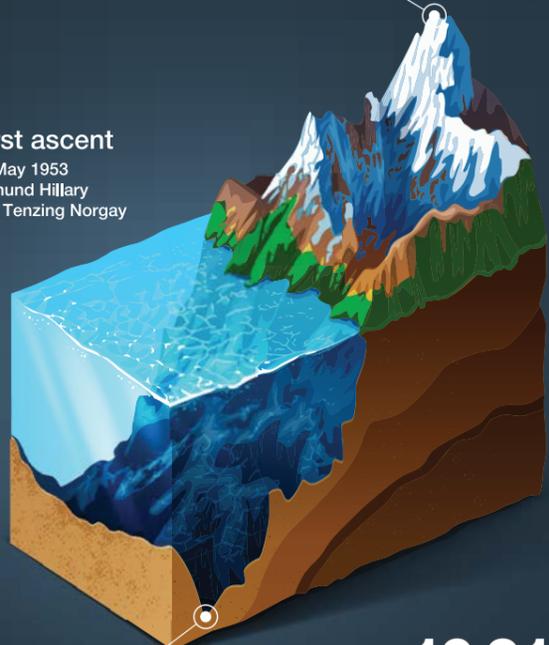
Mount Everest is Earth's highest mountain

Location
Mahalangur section of the Himalayas, China and Nepal

8,848 m
Mount Everest

First ascent

29 May 1953
Edmund Hillary
and Tenzing Norgay



Mariana Trench is the deepest part of the world's oceans

10,911 m
Mariana Trench

Location
Western Pacific Ocean, to the east of the Mariana Island

Descents

1960 "Trieste" USA 1995 "Kaiko" Japan 2009 "Nereus" USA 2012 "Deepsea Challenger"

Case Notes: The World's Greatest Museums

The seas are our **greatest museums** – as well as the wettest! There's more awesome historical stuff in them than in all the surface museums put together.

We've discovered all sorts of things on the seabed, like the remains of ancient ship battles, and Roman shipwrecks that are thousands of years old. Even the engines from Apollo 11's 1969 manned moon landing rocket were on the ocean floor. They dropped into the deep sea after their fuel was used up.

In 2012, we discovered **microbes** from the **Jurassic** era in mud 30 metres below the Pacific Ocean's sea floor. They were still just about alive, consuming what little oxygen they could. Impressive, because they'd had nothing fresh to eat and had seen no sunlight for **86 million years!**

Who knows what we'll find next?

Deepsea Challenger vessel



In 2012, filmmaker James Cameron fulfilled his childhood fantasy. He piloted the **Deepsea Challenger** vessel (which he co-designed) to Challenger Deep, filming the experience in 3D. The vehicle's mechanical arm scooped up rocks and animals.

In 2017, a month-long voyage to explore **Australia's eastern abyss**, 4km below the surface, brought back over 42,000 specimens, including at least **five newly discovered sea species**. There's always more to explore, and now human-occupied vehicles can transport us directly to the sea floor, as their robotic arms scoop up samples. We've come a long way from the days of the bathysphere!



Wreck of the Titanic at the bottom of the Atlantic Ocean

History's deepest dives

On 23rd January 1960, a crew of two explorers was lowered into the Mariana Trench in a sea vessel called the **Bathyscaphe Trieste**. They went down about 11km into the deepest waters of all. They watched lots of tiny, glowing creatures stream upwards past them as they sank. It took nearly five hours to reach the sea floor. When they did, their vessel stirred up lots of silt (which is like fine sand). They said it was like looking into a bowl of milk!



Scientists caught a blobfish at a depth of 2.5km off the coast of New South Wales

I'd jump at the chance to visit Challenger Deep! Wouldn't you?



DISCOVER WHO IS HIDING IN THE DARK DEEP SEA



Across

- 6. This fish is just like a torch...
- 8. Affectionately known in Australia as Mr. Blobby
- 9. Angry-looking, awe-inspiring, dangerously illuminating and absolutely fabulous
- 10. A glow-vomiting shrimp

Down

- 1. This jaw-some fish can eat someone up to four times its own size!
- 2. This eel-shaped, slimy deep-sea survivor can go seven months without eating!
- 3. A small octopus with very big ear-like fins
- 4. This cigar-looking shark is a mini spinning, scary muncher!
- 5. Creepy-looking, sword-faced, snaggle-toothed shark
- 7. This shark's head is bigger than its body!

TRUE OR FALSE

TRUE

FALSE

- 1. All life on Earth needs sunlight. T F
- 2. The deepest part of the Mariana Trench is deeper than Mount Everest is tall. T F
- 3. Giant tube worms have no mouth, stomach or eyes. T F

OCEAN EXPLORATION MILESTONES

Help the Eco Kids complete these milestones in ocean exploration by filling in the date and depth of each event.

Event	Date	Depth
Charles Wyville Thomson discovers life in the deep sea		
Manned exploration of the deep begins		
The Bathyscaphe Trieste reaches the bottom of the ocean – the Pacific's Mariana Trench		
Hydrothermal vents are discovered		
A month-long voyage into Australia's eastern abyss brings back over 42,000 specimens		

DEEP-SEA WORDSEARCH

Find the words below in the deep-sea grid. They may be written forwards, backwards, horizontally, vertically or diagonally.

Darkness

Hydrothermal

Abyss

Vent

Mariana

Vessel

Wreck

Pressure

D	S	R	A	L	U	B	U	T	P	U	I
E	H	L	H	T	M	A	Q	M	R	U	V
D	X	L	E	W	H	T	V	A	Q	X	E
H	Y	D	R	O	T	H	E	R	M	A	L
S	O	E	U	T	O	Y	K	I	V	E	E
A	G	D	S	N	P	S	L	A	F	P	S
K	P	R	S	E	X	P	V	N	F	D	S
A	U	M	E	V	U	H	E	A	P	O	E
B	G	D	R	X	S	E	A	B	E	D	V
Y	N	W	P	I	U	R	T	P	A	D	A
S	P	N	U	S	S	E	N	K	R	A	D
S	E	A	M	O	U	N	T	L	U	R	E

Tubular

Seabed

Deep

Lure

Seamount

Adapt

Bathysphere

See answers at ecokidsplanet.co.uk/free-resources.

COMPETITIONS AND LETTERS

In our 'Zoos' edition, we asked you to create some egg-zotic decorations. As always, your creativity blew us away! Thank you to all who sent us their creations. Here are the five winning entries.

I wanted to do a greenhouse because it represents global warming, and I did some aubergines because if we eat more 'eggplant' and less meat, we could help to slow down global warming. I am vegan, so I wanted to find a way to show veganism through this competition, because I believe it will help ALL the animals if we all cared more about the planet, and going vegan is one way to do this!



Isabella, age 11,
Saltburn-by-the-Sea



These are my egg creatures. I made the killer whale by blowing an egg, then dyeing it with red cabbage (it went dark blue). I made the fins and tails from card and glued them on, then painted on the face. For the narwhal, I dyed the egg in spinach (it went grey). Then I used charcoal from our fire pit in the garden to colour it. I used a shell for the tooth.



Keziah, age 7,
Falmouth

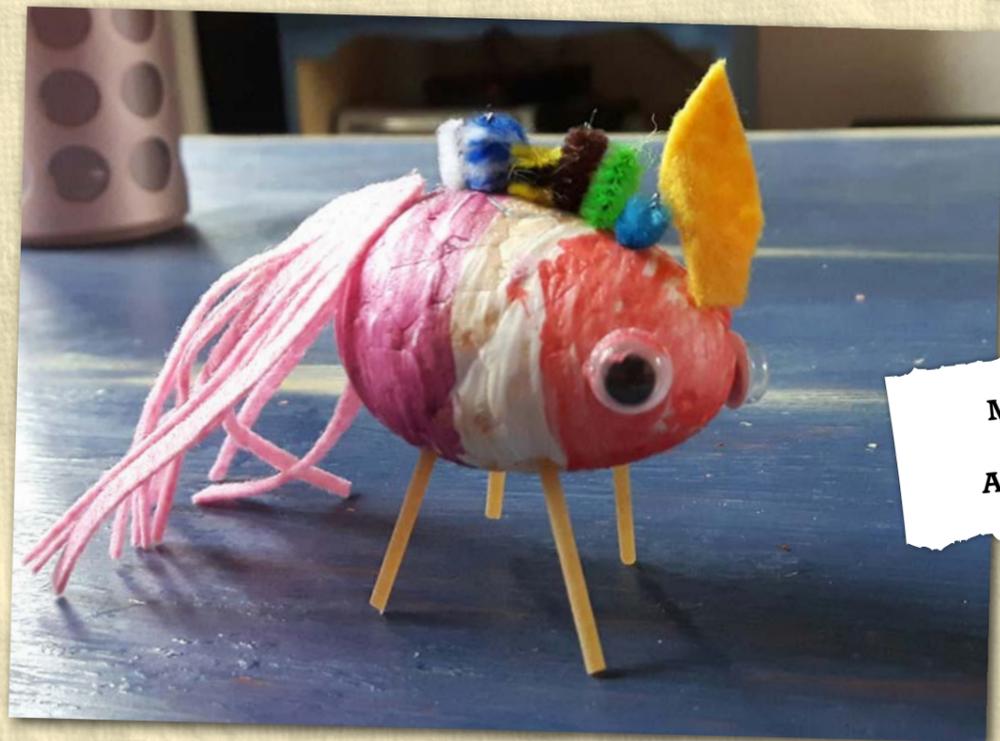


Joshua, age 7,
Edgware
It took me about five hours
in total to make this!



Thomas Webb, age 10,
Les Houches, France

Axel Otl is an axolotl. Axolotls are amphibians that can regenerate limbs and small parts of their brain! Here is one peeping out of a pond.



Maja, age 6,
Durham
A unicorn egg

We loved receiving ALL of your letters! We don't have room to print all the fabulous entries, so we've put more on our website at ecokidsplanet.co.uk/egg-zotic-competition

Testing Water Pressure at Depth

Have you ever heard of a diver talking about 'feeling pressure' when they're underwater? This is because water is much denser than air. A volume of water 10 metres thick applies the same amount of pressure as the entire Earth's atmosphere (which is nearly 130km thick!). So, when a diver descends 20m underwater, they would experience the same pressure as two lots of Earth's atmosphere pushing down on them. However, you don't have to be a diver to see how depth affects water pressure. Just by using a recycled plastic bottle, you can experience it at home with this simple activity.



What you need:

- Large plastic bottle
- Ruler
- Permanent marker
- Large nail or tack with a sharp point
- Duct or masking tape
- Water
- Help from an adult

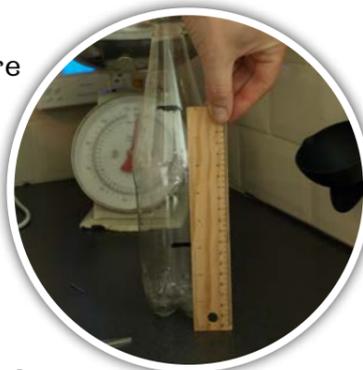
What to do:

Step 1: Ensure your bottle is empty and safely remove any labels.

Step 2: Use your ruler to measure 7cm from the bottom of the bottle. Make a line with your marker.

Step 3: Now measure 20cm from the bottom of the bottle and add another line.

Step 4: Ask an adult to poke the nail or tack into each of the lines you've



made. You only need one hole on each line.

Step 5: Cover up the two holes with tape.

Step 6: Fill up the bottle with water and secure the lid.

Step 7: Stand the bottle near the side of a sink, with the holes pointing towards it.

Step 8: Remove the tape and see what happens! Record your findings in the boxes below.



Which hole did the water move out of the slowest? Top hole Bottom hole

Which hole had more water coming out? Top hole Bottom hole

Which hole do you think had water under greater pressure? Top hole Bottom hole



MONTHLY COMPETITION

DEEP RHYMES

Unleash your inner poet!

The vast, mysterious ocean is full of deep secrets, uncharted trenches and unusual, prehistoric-looking creatures. What could be a better way to describe the fascinating

depths than a poetic verse? We invite you to unleash your inner poet and create some 'deep rhymes' to bring the sounds and rhythms of the ocean's depths to life.

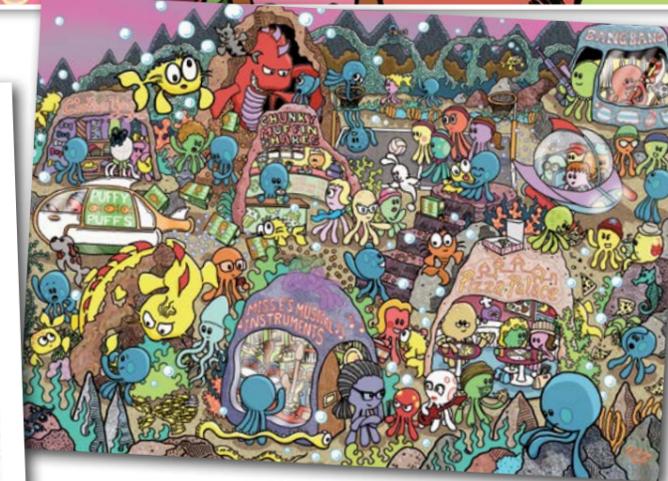
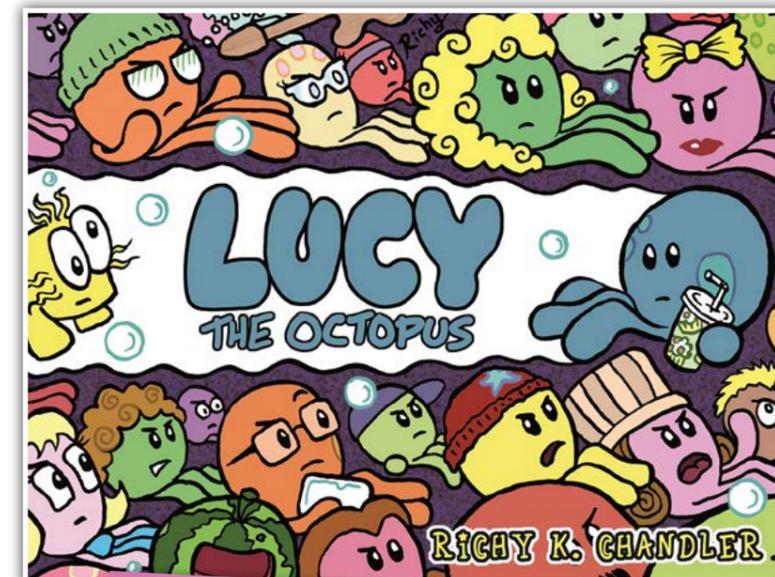
FIVE budding poets will win this fabulous graphic novel from Richy K. Chandler – the comic artist behind Amelia the Fox!

5 TO WIN!

LUCY THE OCTOPUS

By Richy K. Chandler

This funny **graphic novel** stars an unpopular (but kind and talented) teenage octopus named Lucy, and her adorable (if poisonous) pet puffer fish. It celebrates the rewards of being yourself, calls out the uncoolness of bullying, and playfully warns of the perils of social climbing.



Suitable for children aged 9+; recommended for big kids of all ages. RRP £12.99

How to submit your poems:

Send a letter to Eco Kids Planet, 41 Claremont Road, Barnet, EN4 0HR or email win@ecokidsplanet.co.uk before 15th July 2018. Please make sure to include your full name, age and address, so we know how to reach you.

IN THE NEXT ISSUE OF ECO KIDS PLANET

Issue 45/46
Summer Double
Edition

Amazing Animal Migration

Why do Animals Migrate?

IN SEARCH OF A BETTER PLACE



Time to Fly

THE MANY PATHS OF BIRDS, BUTTERFLIES AND BATS

THE GREAT WILDEBEEST MIGRATION

Trip of a lifetime



Dangerous Journeys

THE GREAT RISKS OF MIGRATION

The Red Crabs of Christmas Island

CHARLIE JOINS A LEGENDARY MASS MIGRATION



Giants of the Ocean: Blue Whale

ENDANGERED CREATURE FEATURE

