Polar Atlas is co-written with a polar-region expedition leader and biodiversity conservationist who has spent years traveling across the Arctic and Antarctic, documenting some of the most remote, fragile, and awe-inspiring places on Earth. In this atlas, young readers are guided through unique ecological sites across both poles. Children explore the Low and High Arctic ecosystems. They encounter polar bears, musk oxen, walruses, narwhals, bowhead whales, and the migratory birds. The journey then moves south to the Antarctica, where readers discover volcanic shores, towering glaciers, and vast ice shelves. Along the way, they encounter iconic wildlife including penguins, albatrosses, leopard and elephant seals, whales, and other remarkable Antarctic species.

With vivid illustrations, scientific insights, and stories gathered from real expeditions, Polar Atlas shows how the poles shape the health of our planet and inspires young explorers to understand and protect these remarkable places.

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Scott Kiefer * Zeynep Sevde

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Illustrator:
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CONTENTS

This book belongs to:

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We respectfully acknowledge the Indigenous peoples of the circumpolar North — including Inuit (such as Iñupiat, Kalaallit, Inuvialuit and Inuit of Chukotka), Yupik and Aleut/Unangan peoples, Sámi, Dene and Gwich'in peoples, and the many Indigenous peoples of the Russian North such as Chukchi, Nenets, Dolgan, Evenki, Even, Nganasan, Khanty, Yukaghir and others whose ancestral lands, sea ice routes, and cultural traditions shape the northern world.
Their knowledge, wisdom, and stewardship of the polar regions continue today.

Many Arctic places have long-standing traditional names. Throughout this book, we have used Indigenous place names whenever possible, and we recognize that local naming practices are living, diverse, and evolving. Any errors or omissions are unintentional, and we welcome guidance to improve future editions.

This book is created with gratitude, humility, and respect.

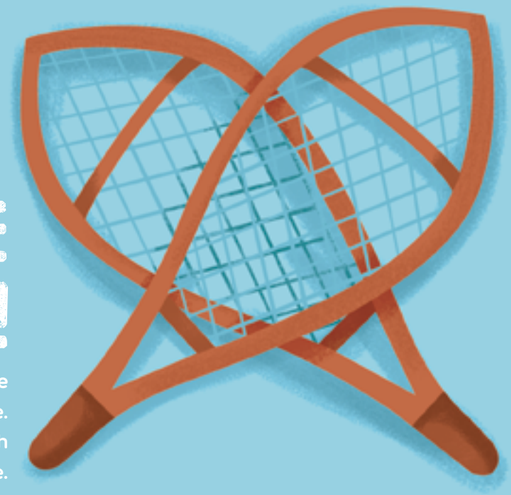
WELCOME TO THE POLAR REGIONS!

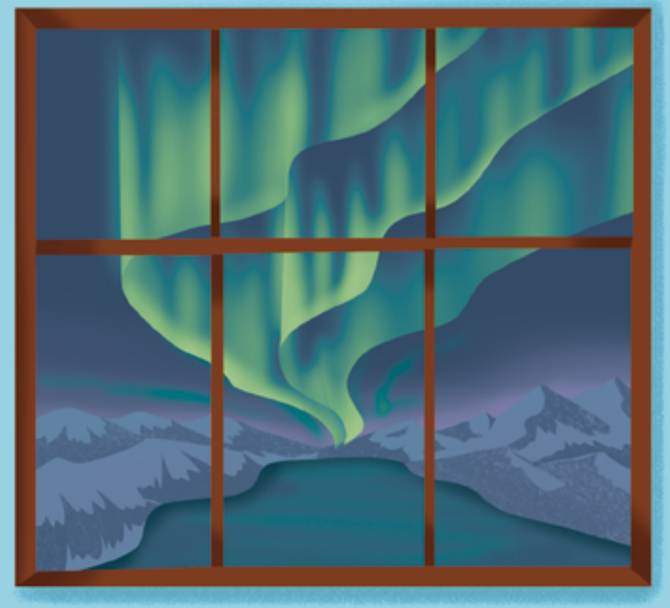
As you turn the pages of this book, we will explore remarkable ecological sites and the animals that call the polar regions home. Our adventure begins in the Subarctic and continues through the Low Arctic and the High Arctic, all the way to The North Pole. Along the journey, we will encounter ancient rock formations, vast tundra landscapes, soaring bird cliffs, powerful rivers, sea-ice coasts, and the communities of Indigenous peoples who have lived in these northern lands for thousands of years.

From there, we journey south into the Antarctic world. We travel through the island-dotted Subantarctic, across the wildlife-rich coasts of the Maritime Antarctic, and onward to the vast frozen continent itself, a land of mysterious glaciers, icy volcanoes, and ancient ice sheets that hold stories millions of years old.

Our adventure continues all the way to the very bottom of the planet, where the coldest, highest, and driest place on Earth awaits: The South Pole.

Get ready for an adventure to the ends of the Earth!





Auroras Galore:
The polar regions are home to stunning light shows, the Aurora Borealis (Northern Lights) in the Arctic and Aurora Australis (Southern Lights) in Antarctica.

Land vs. Sea:
The Arctic is mostly frozen ocean surrounded by land, while Antarctica is a landmass surrounded by ocean.

Polar Extremes:
The coldest temperature ever recorded on Earth was in Antarctica at -128.6°F (-89.2°C)!

Sunlight Surprises:
In summer, the polar regions experience "midnight sun," where the sun doesn't set for months. In winter, they endure polar nights, with no sunrise for weeks.

Frozen Deserts:
Despite all the ice, Antarctica is considered the world's largest desert because it gets very little precipitation!

POLAR SEASONS

WHERE LIGHT AND DARKNESS TRADE PLACES

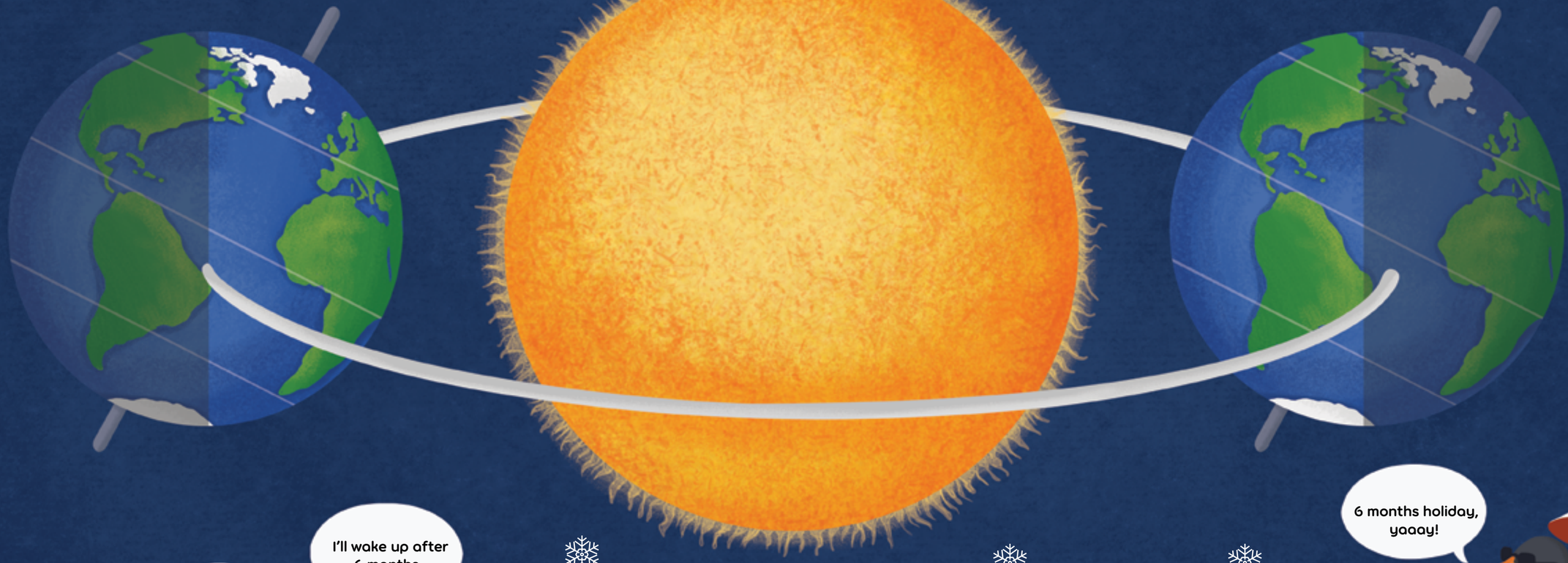
At the polar regions, the seasons behave in ways that seem almost magical. Instead of simple "summer" and "winter," the poles switch between two extremes: months of total darkness and months of endless sunlight. These dramatic seasons are caused not by temperature, but by Earth's tilt. Because our planet leans at an angle as it orbits the Sun, the poles take turns tipping toward the sunlight and then away from it. When a pole leans toward the Sun, it stays in daylight for months, creating a bright, endless summer. When it tilts away, the Sun drops below the horizon and darkness settles in for the long polar winter. This tilt is what creates these astonishing seasons of constant light and constant night.

In the polar winter, darkness wraps the Arctic and Antarctic like a thick blanket. The sun stays below the horizon for months, temperatures plunge, and the world becomes a land of deep blue shadows and darkness. But life doesn't stop; creatures migrate, huddle, or hide, waiting for spring's first rays.

Then comes polar summer, when the sun stays up all day and all night. This is the season of the famous midnight sun, when shadows vanish and the frozen worlds burst to life. Ice melts, plankton bloom, birds return by the millions, and the poles transform almost overnight into buzzing, breathtaking ecosystems.

In the polar regions, the seasons may be extreme, but each one is essential for the life that survives at the edge of our planet.

But in summer, the sun refuses to set. You can read a book outside at midnight without a flashlight!



Summer sunlight wakes up the entire ecosystem. Algae bloom beneath the ice, krill feast, whales migrate, birds lay eggs, and life explodes in fast-forward.

Temperatures can swing by more than 60°C between seasons. From deep freeze in winter to surprisingly mild days in summer.

Some animals use the seasons as a calendar. Caribou migration, penguin nesting, whale feeding, and seal pupping all depend on the return of light.

The Arctic and Antarctic swap seasons. When it's summer in the Arctic, it's winter in Antarctica, and vice versa.

Some animals seem unfazed by the lights. Reindeer, penguins, and polar bears may walk beneath brilliant auroras without even glancing up!

Auroras are silent dancers. Even though they look like roaring flames, they make no sound and appear as shimmering movements across the sky.

Auroras happen at both poles at the same time. Like twins, the Northern and Southern Lights often mirror each other across the globe.

The colors come from different gases in the atmosphere. Green is the most common, but pink, red, purple, and blue glow during especially strong storms.

The Sun is the artist behind the show. Powerful bursts from the Sun send charged particles speeding toward Earth, triggering auroras. Purple, and blue glow during especially strong storms.

AURORA:
THE SKY'S MOST MAGICAL LIGHT SHOW

In the polar regions, the night sky can suddenly burst into shimmering greens, pinks, and purples that swirl like ribbons and dance across the darkness. These glowing lights are called auroras. In the Arctic they are known as the Aurora Borealis (Northern Lights), and in Antarctica they are the Aurora Australis (Southern Lights).

Auroras happen when energy from the Sun travels through space and reaches Earth's magnetic poles. When these charged particles meet the gases high in our atmosphere, the sky comes alive with light. Indigenous Peoples have told stories about these moving lights for centuries, comparing them to dancing spirits, flickering fires, and pathways to the stars.

Whether seen from an icy ship in Antarctica or from a snowy hilltop in the Arctic, auroras are one of the most unforgettable experiences on Earth.

Earth's magnetic field guides the lights. They appear near the poles where Earth's magnetic lines come closest to the atmosphere.

In space, auroras look like giant glowing rings. Astronauts on the International Space Station see them from above, stretching like neon halos around the poles.

You can't see auroras during polar summer. The midnight sun is too bright—so the best aurora season is during the long, dark winter nights.

ICE: A GUIDE TO THE FROZEN SHAPES OF THE POLAR REGIONS

In the polar regions, ice reveals stories from the past, the present, and even the future. The polar regions are filled with frozen shapes of every size: drifting pancakes, towering icebergs, hidden growlers, and giant sheets that blanket entire continents. Each type of ice forms in its own special way, shaped by wind, waves, cold, and time. Learning these names is like learning the alphabet of the polar world. Once you know them, the ice becomes a storybook full of clues about how the Arctic and Antarctic change, move, crack, melt, and grow again.

Some ice floats on the sea. Some forms in slow-moving rivers of ice created from centuries of falling snow. Some breaks off as massive icebergs the size of cities, while others form as tiny, delicate crystals that swirl through the waves. From the smallest flakes to the largest ice shelves in Antarctica, every piece of ice has a story to tell about the coldest places on Earth.

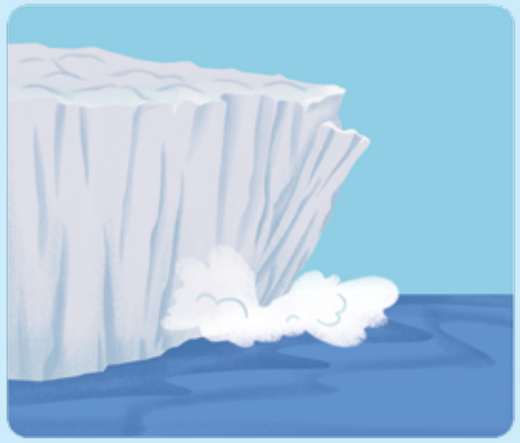
THE GIANTS

Ice sheets are the biggest ice formations on Earth. They cover entire continents like Greenland and Antarctica and hold most of the world's freshwater.

Glaciers move like slow rivers. Formed from centuries of packed snow, they slide and sculpt mountains as they creep downhill.

Ice shelves are floating platforms of ice. These are the seaward extensions of glaciers—thick, towering slabs that can stretch for hundreds of kilometers.

WHEN ICE BREAKS AWAY



Calving is the glacier's dramatic farewell. This is when a huge piece of ice snaps off a glacier or ice shelf and crashes into the sea.

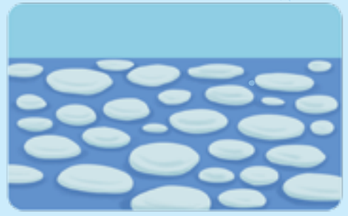
Icebergs are the giants of the ocean. These floating mountains rise at least 5 meters above the water and can be bigger than skyscrapers or city blocks.

MEDIUM + SMALL FLOATING ICE

Bergy bits and growlers are iceberg "crumbs." Bergy bits stand 1–5 meters above the water, while growlers are less than 1 meter, making them easy to miss.

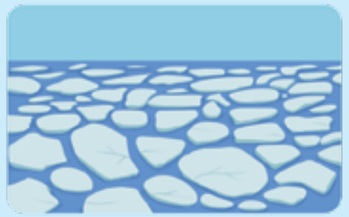
Brash ice is a sea of shattered pieces. These are the fragments left from broken icebergs and sea ice, all under 2 meters in size.

NEW + FORMING ICE



Pancake ice looks like round, bumpy discs form when waves push slushy ice into circles with raised edges.

Nilas is the ocean taking its first icy breath. This thin, bendy layer of new ice looks dark and silky as seawater begins to freeze.



Frazil ice is the snow-globe stage of freezing. Tiny ice crystals swirl in cold, turbulent water before they thicken into solid ice.

SPECIAL SEA-ICE FEATURES

Polynyas are windows in a frozen ocean. These natural openings in the sea ice create crucial breathing and feeding spots for seals, penguins, and whales.

Leads are nature's icy highways. Long, narrow cracks in the sea ice open and close with wind and currents, helping animals and explorers move across the frozen world.

POLAR NOMADS

Meet the polar nomads: Birds that cross entire oceans, whales that swim from the equator to the ice, and tiny songbirds that make heroic journeys far bigger than their bodies suggest.

Every year, the skies and seas become invisible highways. Arctic terns fly from one end of the planet to the other. Whales follow ancient underwater routes to reach rich polar feeding grounds. Even small birds and fish make extreme migrations. These nomads depend on the rhythm of the seasons, the movement of ice, and the availability of food. Their journeys connect the whole planet!

The polar regions may look empty and still, but every migration season, they become crossroads for some of Earth's greatest travelers.

The Arctic Tern is the world champion traveler. It flies up to 70,000 km every year, migrating from the Arctic all the way to Antarctica and back, seeing more daylight than any other animal on Earth!

Not all nomads have wings. Gray whales migrate from Mexico to the Arctic—a 10,000 km journey one way—while elephant seals travel long distances twice a year to feed and molt.

Some birds travel farther in a year than humans do in a lifetime. Short-tailed and sooty shearwaters can fly 30,000 km or more between hemispheres. That's like circling the planet nearly once!

Migrating animals act like living bridges between the poles. Some species spend summer in the Arctic and winter near Antarctica, connecting the world's coldest places through their epic journeys.

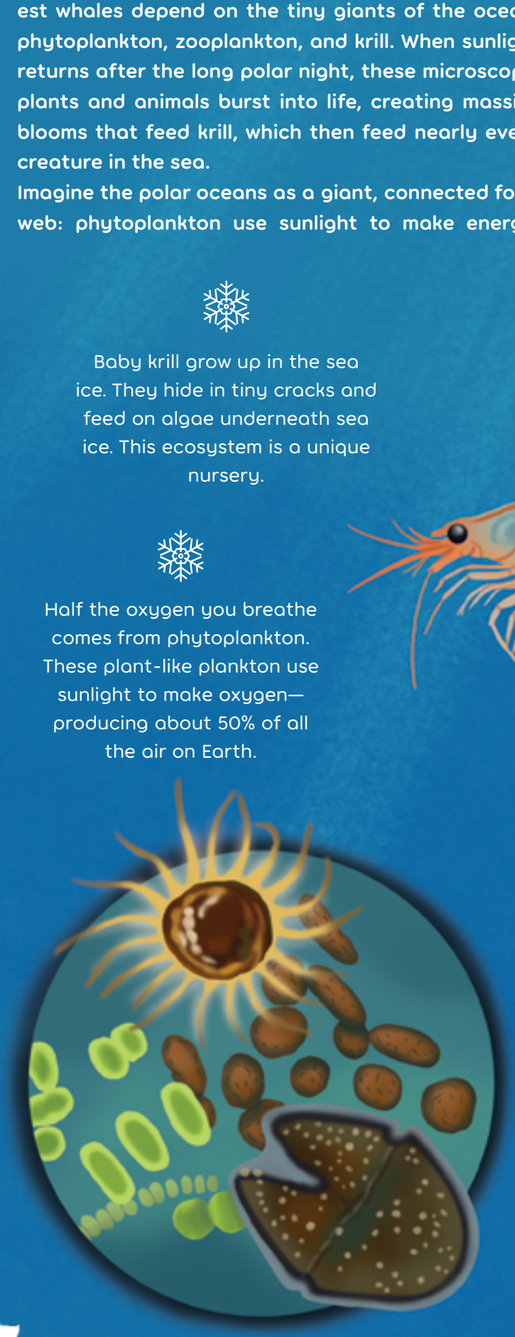
Whales use "ocean memory" to navigate. Humpback and blue whales follow ancient migratory paths between warm tropical nurseries and icy polar feeding grounds, some trips stretch 16,000 km each year.

TINY GIANTS

At the frozen ends of the Earth, life's grand story starts with its tiniest creatures.
In both the Arctic and Antarctic, everything from drifting jellyfish to soaring seabirds and the largest whales depend on the tiny giants of the ocean: phytoplankton, zooplankton, and krill. When sunlight returns after the long polar night, these microscopic plants and animals burst into life, creating massive blooms that feed krill, which then feed nearly every creature in the sea.
Imagine the polar oceans as a giant, connected food web: phytoplankton use sunlight to make energy, zooplankton feed on these tiny plants, and krill eat both—becoming the powerful fuel that supports entire ecosystems. From fish and squid to penguins, seals, seabirds, and even the largest whales on Earth, every creature depends on the energy that begins with these tiny drifters. Each connection relies on the next, and without these small creatures at the start, nothing else would flourish.
Though you may never see them, these tiny giants power the polar ecosystems and make all the extraordinary places and animals we visit in this atlas possible.

Baby krill grow up in the sea ice. They hide in tiny cracks and feed on algae underneath sea ice. This ecosystem is a unique nursery.

Half the oxygen you breathe comes from phytoplankton. These plant-like plankton use sunlight to make oxygen—producing about 50% of all the air on Earth.

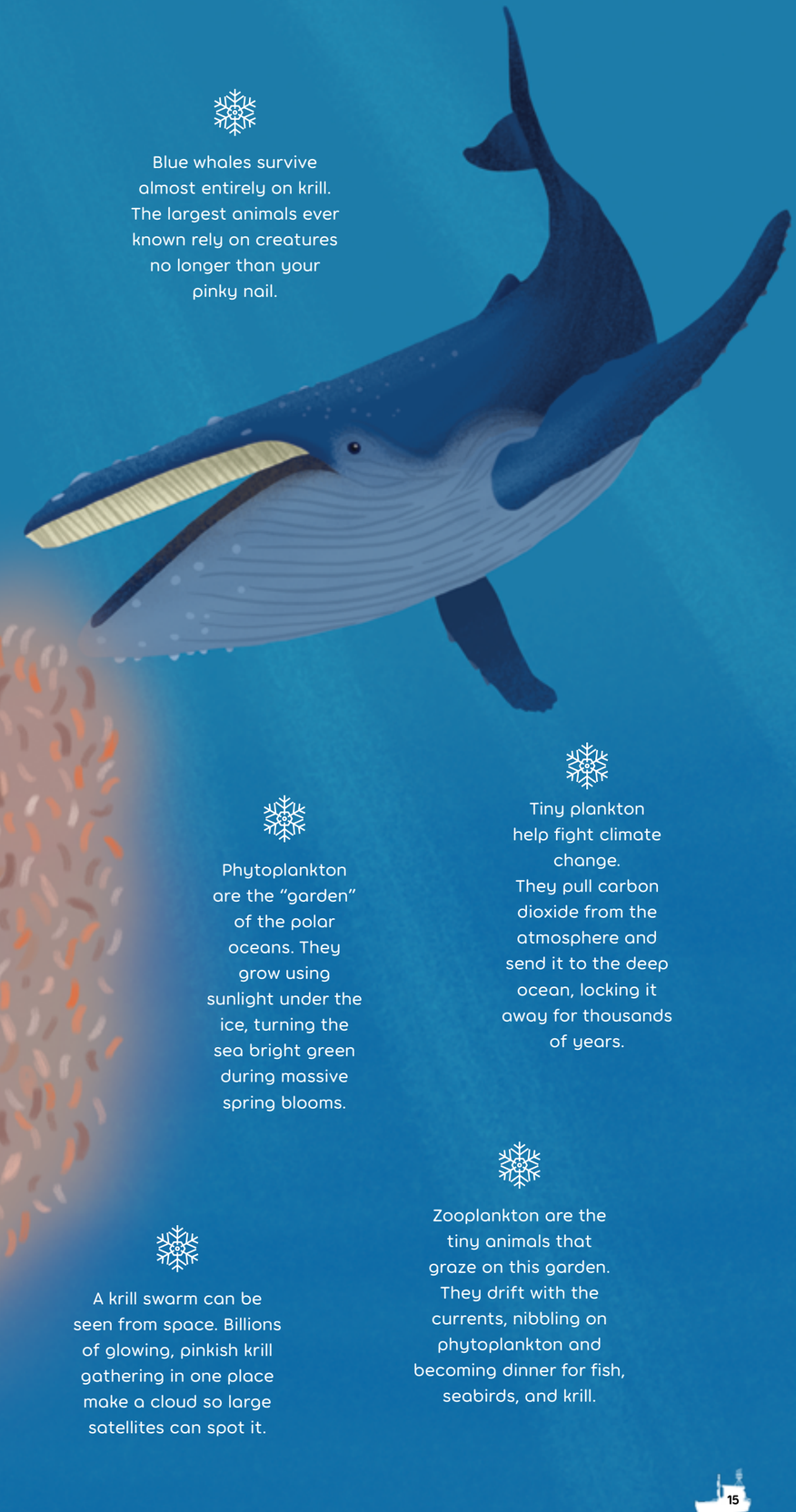


Krill glow in the dark. Their bioluminescent light organs help them blend in or communicate beneath the ice.

Krill are the super-powered link in the chain. Bigger and stronger than most plankton, krill eat both phytoplankton and zooplankton and then become the vital food source for whales, seals, penguins, and almost every other large animal in the polar oceans.

Zooplankton make the biggest migration on Earth every single day. They rise to the surface at night and sink again by day, traveling huge distances compared to their tiny bodies.

Blue whales survive almost entirely on krill. The largest animals ever known rely on creatures no longer than your pinky nail.



Phytoplankton are the "garden" of the polar oceans. They grow using sunlight under the ice, turning the sea bright green during massive spring blooms.

Tiny plankton help fight climate change. They pull carbon dioxide from the atmosphere and send it to the deep ocean, locking it away for thousands of years.

A krill swarm can be seen from space. Billions of glowing, pinkish krill gathering in one place make a cloud so large satellites can spot it.

Zooplankton are the tiny animals that graze on this garden. They drift with the currents, nibbling on phytoplankton and becoming dinner for fish, seabirds, and krill.


Gyrfalcon
Falco rusticolus
Snow Goose
Anser caerulescens
Ivory Gull
Pagophila eburnea
Musk Ox
Ovibos moschatus
Peary Caribou
Rangifer tarandus pearyi
Siberian Brown Bear
Ursus arctos collaris
Putorana Snow Sheep
Ovis nivicola borealis
Ermine
Mustela erminea
Lesser Golden Plover
Pluvialis dominica
Arctic Geese
Anser albifrons
Black Bear
Ursus americanus
Tufted Puffin
Fratercula cirrhata
Thick-billed Murre
Uria lomvia
Atlantic Puffin
Fraterculo arctica
Lesser White-fronted Goose
Anser erythropus
Siberian Lemming
Lemmus sibiricus
Red Knot
Anser erythropus
Curlew Sandpiper
Calidris ferruginea
Red-legged Kittiwake
Rissa brevirostris
Red Phalarope
Phalaropus fulicarius
Narwhal
Monodon monoceros
Bowhead Whale
Balaena mysticetus
Snowy Owl
Bubo scandiacus
Razorbill
Alca torda
Northern Fulmar
Fulmarus glacialis
Arctic tern
Sterna paradisaea
Svalbard Reindeer
Rangifer tarandus platyrhynchus
Reindeer
Rangifer tarandus
Arctic Fox
Vulpes lagopus
Arctic Hare
Lepus arcticus
Northern Fur Seal
Callorhinus ursinus
Polar Bear
Ursus maritimus
Ringed Seal
Pusa hispida
Pacific Walrus
Odobenus rosmarus divergens)
Beluga Whale
Delphinapterus leucas
NORTH POLE

ARCTIC: THE FROZEN OCEAN

WELCOME TO THE TOP OF THE WORLD!

This is the Arctic, the frozen region that circles the very top of our planet! The Arctic is a vast frozen ocean surrounded by wide tundra plains, snow-covered forests, rugged mountains, and ancient northern homelands. Sea ice spreads across the Arctic Ocean each winter, while on land the ground itself can stay frozen for thousands of years.

Despite its extreme cold and long, dark winters, the Arctic is alive with extraordinary life. In the ocean, tiny plankton bloom in summer sunlight, attracting fish, seals, and whales. On the tundra, mosses, lichens, and hardy plants carpet the ground for a few short months, feeding herds of caribou and musk oxen. Arctic foxes hunt along the coasts, snowy owls watch from frozen ridges, and polar bears roam the drifting ice in search of a meal. Millions of migratory birds travel here each summer, turning the region into one of the busiest nurseries on Earth.

The Arctic may look quiet and empty from far away, but it is one of the most dynamic and important ecosystems on the planet. Here, everything, from plankton to permafrost, from caribou trails to drifting sea ice, plays a part in shaping the future of our changing world.

LIFE ON THE EDGE

Where frozen ocean meets open water lies one of the most active ecosystems in the north: the Arctic ice edge. In spring and summer, when sunlight returns, the quiet, icy world wakes up all at once. Tiny microscopic plants bloom in the open water, swarms of zooplankton rush into feed, and Arctic cod weave through the shining green sea. Suddenly the whole Arctic is moving! Seals, whales, seabirds, and hungry polar bears all gathered along this thin, moving line where food appears first. Everything here depends on the rhythm of freeze and melt.

ST. GEORGE ISLAND & THE GREEN BELT

If you look at a satellite photo of the Bering Sea, you'll notice a bright green band stretching across the water. This is the Green Belt, a place where deep, cold currents bring nutrients rushing to the surface, feeding huge blooms of plankton and turning the ocean into one of the most productive ecosystems on Earth.

Right in the middle sits St. George Island, a tiny volcanic island surrounded by cliffs, waves, and staggering amounts of life. Millions of seabirds nest here, fur seals crowd the beaches, and fish swarm in the rich waters below. It's one of the busiest wildlife hotspots in the entire North Pacific. Small on the map, but enormous in ecological power.

Murres crowd St. George's cliffs in huge, noisy colonies. Under the waves, they "fly" underwater with strong wings, diving more than 600 feet (180 m) to chase fish like pollock and cod.

Northern Fur Seals return to St. George Island every summer to give birth and raise their pups. Males can reach 7 feet long, while females are much smaller. Built for speed and deep dives, they chase squid and fish through the rich waters of the Green Belt.

The Bering Sea supports some of the world's richest cold-water ecosystems.

Satellites can see Green Belt plankton blooms from space!

With bright orange feet, a bold beak, and a wild golden tuft, tufted puffins look ready for a costume parade. But they're serious hunters and powerful swimmers that dive after fish with expert precision.

Pollock may look plain, but they're superstars of the Bering Sea. These fast-moving fish travel in enormous schools and feed seals, seabirds, whales and even people. Without pollock, the Bering Sea food web would collapse.

LÁTRABJARG CLIFFS: BIRD KINGDOM OF THE NORTH ATLANTIC

At the far western edge of Iceland rise the towering Látrabjarg Cliffs, a 14-kilometer wall of rock plunging into the Atlantic Ocean. Reaching heights of more than 400 meters, these cliffs are one of the greatest seabird strongholds in all of Europe. In summer, the air rumbles with wings and seabird calls as millions of birds crowd onto narrow ledges carved by wind and waves.

Látrabjarg is one of the best places in the world to see Atlantic Puffins, with their bright orange bills and comical waddles. Iceland is home to about 60% of the world's puffins, and huge numbers return each year to nest in burrows atop the grassy cliffs. Alongside them, razorbills, guillemots, and northern fulmars fill every available ledge, creating a bustling "bird city" high above the crashing sea.

Because of its incredible wildlife, Látrabjarg is a protected nature reserve, an essential sanctuary for seabirds in a changing ocean. Standing here, where Europe almost ends, feels like standing at the edge of the world.

The cliffs stretch for 14 km long and 400 m tall.

Small, colorful, and full of personality, puffins are the iconic stars of these cliffs.

Guillemots lay their eggs directly on bare rock ledges.

Látrabjarg is nearly the westernmost point in Europe.

Iceland hosts 60% of the world's Atlantic Puffins.

Fulmars can live over 40 years, gliding for miles on stiff ocean winds.

QUTTINIRPAAQ NATIONAL PARK

At the northeastern tip of Ellesmere Island lies one of the most remote and awe-inspiring places on Earth: Quttinirpaaq National Park, a vast polar desert of mountains, glaciers, and shimmering blue lakes. Its name means "top of the world" in Inuktitut and it truly feels like it. Here, summer brings endless sunlight; winter, months of darkness. The air is dry, the land ancient, and life survives only through extraordinary adaptation.

The park's hidden jewel is Lake Hazen, the largest freshwater lake by volume in the High Arctic. Sheltered by south-facing mountains and warmed by glacial meltwater, the Lake Hazen Basin forms a rare polar oasis with lush tundra meadows, plentiful plants, and surprising wildlife abundance compared to the stark polar desert around it. Muskoxen graze the valleys, Arctic wolves roam the ridges, Arctic hares bound across gravel plains, and rare birds nest along river deltas. Beneath the lake's icy surface lives a unique population of Arctic Char, isolated for thousands of years. Though harsh and extreme, Quttinirpaaq holds one of the most pristine ecosystems left on the planet.

Some valleys here are so dry they resemble landscapes on Mars.

Quttinirpaaq is Canada's second-largest national park and one of the most northern protected areas on Earth.

Arctic wolves patrol the barren ridges and gravel plains of Quttinirpaaq, perfectly built for life in extreme cold.

The smallest and most northern of all caribou, Peary caribou roam the High Arctic islands, blending almost perfectly with snow and pale gravel.

Quttinirpaaq is one of the least visited national parks in the world.

Quttinirpaaq is a refuge for Arctic wolf, Peary caribou, muskoxen, Arctic hare, and rare birds.

ALKEFJELLET: CLIFFS FULL OF LIFE

On the northeastern coast of Spitsbergen rises one of the most dramatic walls of rock in the entire Arctic: Alkefjellet, meaning "Auk Mountain." This towering black cliff plunges straight into the icy Hinlopen Strait, its face carved into breathtaking vertical columns of ancient dolerite. These giant hexagon-like pillars were created when magma cooled millions of years ago making Alkefjellet look like a colossal staircase built for giants.

But what makes this place truly astonishing is the noise because every summer, Alkefjellet becomes a roaring city of seabirds. More than 60,000 pairs of Brünnich's Guillemots pack the narrow cliff ledges, standing shoulder-to-shoulder as they guard their single precious egg. Gulls and skuas circle overhead, Arctic foxes wait below, and the cold waters beneath teem with the fish that fuel this entire colony.

Protected within the vast Nordaust-Svalbard Nature Reserve, one of Europe's largest wildlife sanctuaries, Alkefjellet is one of the Arctic's most important seabird breeding sites and one of its most unforgettable natural spectacles.

Guillemot chicks leap off cliffs before they can fly.

Alkefjellet is one of the largest seabird cliffs in the entire Arctic.

The site is so remote that visitors can only observe it by ship.

Graceful and ghostly white, the ivory gull is one of the most ice-dependent birds on Earth.

The cliff's dolerite columns formed over 100 million years ago from cooling magma.

NORTH POLE: THE TOP OF THE WORLD

At the very top of the planet, where every direction you look is south, lies the North Pole. There are no mountains, no trees, no towns, and no land at all. Instead, the North Pole sits in the middle of the frozen Arctic Ocean, covered year-round by drifting sea ice that is always moving, cracking, and reforming.

Standing here feels almost otherworldly. The ice beneath your feet may be a few meters thick, the ocean below over 4,000 meters deep, and the sky a soft dome of endless light in summer or endless night in winter. Compass needles spin. Time zones blur. Even the sea ice is never still—it drifts slowly, pushed by winds and currents, carrying everything on it like a giant, frozen conveyor belt.

It is one of the most extreme environments on Earth, remote, cold, and constantly shifting. It is also a place of serenity and astonishing beauty.

All lines of longitude meet here, every direction from this point is south.

Winter darkness lasts for months; summer brings 24 hours of light.

Polar bears roam the sea ice, following seals that use cracks and breathing holes.

Plankton blooms form under the ice in spring, feeding the entire Arctic food web.

The Sun rises once per year (in March) and sets once per year (in September).

The sea ice at the Pole can drift tens of kilometers a day.

Light-mantled Sooty Albatross
Phoebetria palpebrata

Wandering Albatross
Diomedea exulans

Southern Elephant Seal
Mirounga leonina

Black-browed Albatross
Thalassarche melanophris

King Penguin
Aptenodytes patagonicus

Antarctic Fur Seal
Arctocephalus gazella

Macaroni Penguin
Eudyptes chrysolophus

Adélie Penguin
Pygoscelis adeliae

Chinstrap Penguin
Pygoscelis antarcticus

Magellanic Penguin
Spheniscus magellanicus

Royal Penguin
Eudyptes schlegeli

South Georgia Pipit
Anthus antarcticus

Antarctic Petrel
Thalassoica antarctica

Antarctic Skua
Stercorarius maccormicki

Macquarie Shag
Leucocarbo purpurascens

Snow Petrel
Pagodroma nivea

Southern Giant Petrel
Macronectes giganteus

Emperor Penguin
Aptenodytes forsteri

Gentoo Penguin
Pygoscelis papua

Eastern Rockhopper Penguin
Eudyptes filholi

Orca
Orcinus orca

Hourglass Dolphin
Lagenorhynchus cruciger

Crabeater Seal
Lobodon carcinophaga

Leopard Seal
Hydrurga leptonyx

Minke Whale
Balaenoptera bonaerensis

Humpback Whale
Megaptera novaeangliae

SOUTH POLE

ANTARCTICA: THE FROZEN CONTINENT

WELCOME TO THE WHITE CONTINENT AT THE BOTTOM OF THE WORLD!

This is Antarctica, the frozen continent at the very bottom of our planet! Here, layers of ice lie so thick they bury mountains and reshape the land below. This is the coldest, windiest, and driest place on Earth.

Despite its fierce climate, Antarctica is full of extraordinary life. Tiny resilient organisms thrive in secret ecosystems beneath the ice. Penguins waddle along snowy shores. Seals rest on floating ice floes. Enormous whales glide through the frigid Southern Ocean, following swirls of krill and cold-water currents that circle the entire globe.

Antarctica may seem empty at first glance, but it is one of the most astonishing and important ecosystems on Earth. This is a place where everything, from plankton to penguins to ice sheets, plays a part in shaping our planet's future.

LIFE ON THE EDGE OF ICE

Where frozen sea meets open water lies one of the busiest biological hotspots on Earth: the Antarctic ice edge. In winter, Antarctica doubles in size as sea ice spreads far into the Southern Ocean. When spring returns, the ice retreats, revealing open water along the continent's fringe. Sunlight floods back after months of darkness, awakening blooms of algae beneath the ice. Krill swarm to feed, drawing penguins, seals, seabirds, and whales into a frenzy of life. The ice edge is the lifeline of the Southern Ocean.

Bird Island
Saint Andrews Bay
Drake Passage
Deception Island
Gerlache Strait
Neko Harbour
Atka Bay
South Pole
Lake Vostok
McMurdo Dry Valleys
Ross Sea & Ross Ice Shelf
Cape Adare
Prydz Bay
Heard Island & McDonald Islands
Macquarie Island

WHERE OUR JOURNEY BEGINS

Our Antarctic adventure starts at the Antarctic Convergence Zone, where cold polar waters meet the slightly warmer waters of the north. This natural boundary encircles the entire continent and marks the beginning of the Subantarctic—a region of remote, windswept islands alive with wildlife.

Here, millions of seabirds nest on grassy slopes. Elephant seals roar on rocky beaches. King penguins fill entire plains with their bright feathers and noisy gatherings. These islands are stepping stones to the icy continent itself.

From the Subantarctic, we will travel steadily southward—through the Maritime Antarctic, into the High Antarctic, and finally across the vast icy plateau to the South Pole.

SAINT ANDREWS BAY: KINGDOM OF PENGUINS

On the wild coast of South Georgia lies a place so full of life that it feels almost unreal: Saint Andrews Bay, home to one of the largest King Penguin colonies on Earth. Here, between 300,000 and 500,000 pairs of penguins gather on long beaches backed by glaciers and windswept mountains. The colony stretches as far as the eye can see!

This spectacular bay is part of the Subantarctic, a region where cold ocean meets rugged land and wildlife thrives in astonishing abundance. Along the shore, giant male elephant seals thump and bellow in the surf, smashing their chests together to decide who rules the beach and the sweet metallic call of the South Georgia pipit, the southernmost songbird on Earth, carries through the tussock grass.

Saint Andrews Bay is not merely a colony; it is a city of animals, a place where millions of lives intersect in one of the most vibrant ecosystems on Earth!

The beaches shimmer with feathers — King Penguin colonies are surprisingly fragrant and noisy!

Over half a million King Penguins may gather here in a single season.

Each penguin has a unique vocal signature, allowing families to find one another among thousands.

South Georgia holds the densest concentration of marine mammals on Earth.

Small, camouflaged, and once extremely rare, this pipit is unique to South Georgia.

The world's largest seal species hauls out on Saint Andrews Bay in impressive herds.

Elephant seal bulls can be heavier than a pickup truck.

DRAKE PASSAGE: THE WILDEST SEA ON EARTH

To reach the continent of Antarctica, travelers cross the legendary Drake Passage, the infamously stormy stretch of water between Cape Horn and the northern tip of the Antarctic Peninsula. This is the shortest route from any continent to Antarctica, but also the most unpredictable. Here, three great oceans meet: the Atlantic, the Pacific, and the massive Antarctic Circumpolar Current, the fastest-flowing current on the planet.

The Drake can be calm and glassy one day, then erupt into 10-meter waves the next. Winds race around the globe with no continents to slow them. Storms build without warning. For centuries, sailors feared this place because more than 800 ships are believed to have been lost to its fierce waters, and thousands of sailors with them.

But the Drake Passage is also full of life. Albatrosses soar effortlessly above the waves. Dolphins and penguins porpoise through the water and seabirds glide along the ship as if guiding it southward, pointing the way toward the ice.

Crossing the Drake Passage is the gateway to Antarctica, a true rite of passage into the frozen continent.

Drake Passage connects the Atlantic and Pacific Oceans with the Southern Ocean.

Seabirds use these winds to soar for hours without flapping their wings.

With bold chocolate-and-white wings, Antarctic petrels are expert soarers of the stormy Southern Ocean.

The Drake can be the "Drake Lake" (calm) or the "Drake Shake" (legendary storms).

Hourglass dolphins are among the least-studied dolphins in the world — and the Drake Passage is one of the best places to spot them.

Lively, tough, and great swimmers, Magellanic penguins are some of the first penguins seen on the way south.

The strait is famous for mirror-calm days when mountains reflect perfectly on the water.

Orcas are some of the most adaptable predators on Earth.

Humpbacks here can eat up to 1,500 kg of krill per day in peak season.

Some humpbacks return to the exact same feeding bays year after year.

Orcas surf the bow waves of icebreakers and sometimes approach research ships.

Humpback males sing complex songs up to 30 minutes long that can travel for miles.

Cold, nutrient-rich water wells up from the deep beneath the Gerlache Strait, feeding enormous blooms of phytoplankton. Krill gather in dense clouds—sometimes so thick they can be seen from space. Where there's krill, there are whales.

Gerlache Straitis one of the richest whale-feeding hotspots in all of Antarctica.

GERLACHE STRAIT: A PARADISE FOR WHALES

Between the steep mountains of the Antarctic Peninsula and a chain of rocky islands lies the Gerlache Strait, one of the most beautiful waterways in the entire Southern Ocean. Glaciers spill into the sea on all sides. Icebergs drift past like floating sculptures. And beneath the cold, blue water, the ocean thrives with life.

The Gerlache Strait is famous for one thing above all: whales! Humpbacks, orcas, and occasionally minke whales gather here in great numbers to feed on huge swarms of krill. Calm, sheltered, and bursting with nutrients, the strait is one of the best places in Antarctica to see whales up close.

Named after Belgian explorer Adrien de Gerlache, whose expedition first charted it in the late 1800s, the strait is now a favorite route for scientists and explorers... and a feeding ground for some of the ocean's greatest giants.

NEKO HARBOUR: PENGUINS, GLACIERS, AND THE ANTARCTIC MAINLAND

Tucked deep along the Antarctic Peninsula is Neko Harbour, one of the rare places where visitors can actually set foot on the Antarctic mainland. Surrounded by steep mountains and giant glaciers that spill straight into the sea, the harbour feels like a hidden amphitheater made of ice. Neko Harbour is anything but quiet. This is a place where the landscape never sits still. Towering glaciers creak and rumble. Sometimes huge chunks of ice calve off with a thunderous crash, sending waves rolling across the harbor. Avalanches tumble down steep slopes. Even the air trembles with sound.

Amid all this icy drama, Neko Harbour is full of life. A bustling colony of gentoo penguins nests on the rocky slopes, waddling to and from the sea with pebbles, calls, and determination.

Neko Harbour is named after the *Neko*, a whaling ship that visited the area in the early 1900s.

Neko Harbour is one of the most photogenic and accessible places on the peninsula.

Whales — including humpbacks and minkes — often feed just outside the harbour.

Gento penguins are the fastest swimming penguin, reaching 36 km/h (22 mph).

Gentoos are lively, hardworking penguins — and they bring color and humor to Neko Harbour.

Gentoos are "pebble thieves," stealing stones to build tall, dry nests.

Leopard seals are essential to keeping the Antarctic ecosystem balanced — fierce, fascinating, and unforgettable.

ROSS ICE SHELF: THE LAST OCEAN FRONTIER

South of New Zealand lies one of the most untouched marine ecosystems left on Earth: the Ross Sea. Scientists call it "The Last Ocean" because it remains almost completely pristine; a rare window into what the world's oceans looked like before industrial fishing and global change.

Fringing this vast bay is the colossal Ross Ice Shelf, a floating slab of ice the size of France. Its gleaming white cliffs rise straight from the sea, holding back glaciers that flow from the heart of Antarctica. Beyond the shelf, on nearby Ross Island, stands Mount Erebus, the world's southernmost active volcano, with a glowing lava lake hidden inside its crater.

The Ross Sea is a place of extremes: endless summer daylight, fierce winds, giant icebergs, and some of the richest waters in the Southern Ocean. Here, emperor penguins huddle through the dark winter, Weddell seals sing beneath the ice, and Type-C killer whales glide in sleek, coordinated pods.

This is Antarctica at its most dramatic and wild, a living laboratory for life at the edge of Earth.

The ice front moves about 1 meter per day, calving icebergs the size of cities

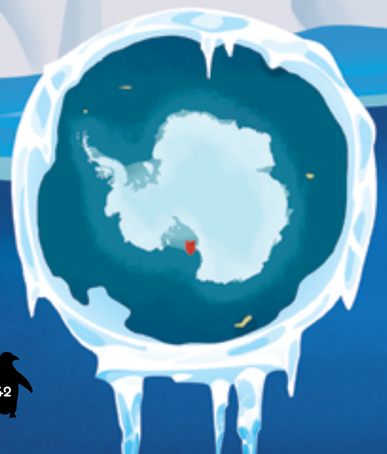
The Ross Ice Shelf is so large it creates its own weather patterns.

The Ross Ice Shelf is Antarctica's largest floating ice platform — over 500,000 km², nearly the size of France.

Some microbes near Erebus are studied as analogs for potential life on Mars.

Captain James Clark Ross first charted the area in 1841.

On nearby Ross Island rises Mount Erebus — the southernmost active volcano on Earth.



The Ross Sea MPA is the largest marine protected area on Earth.

Antarctic Toothfish is a slow-growing, cold-adapted apex predator sometimes called "Antarctic cod."

Type-C Killer Whales are perfectly adapted to life along the floating ice.

About the Authors

Polar Atlas was born from a serendipitous meeting at the edge of the world. Scott Kiefer and Zeynep Sevde first met while on expedition in Antarctica, where a shared passion for exploration, science, fine arts, storytelling, and the natural world sparked this remarkable collaboration.

Scott Kiefer

Scott Kiefer is an artist, author, environmental scientist, and expedition leader whose life's work has taken him to some of the most extraordinary places on Earth. From the frozen worlds of Antarctica and the Arctic to the vast Pacific, the Indonesian archipelago, the extraordinary landscapes and marine realms of India and Africa, and the remarkable ecosystems of South America, he has devoted decades to exploring, studying, and protecting some of Earth's most remote and fragile environments.

Holding a Master of Science in Environmental Science & Policy from Johns Hopkins University and a Bachelor of Fine Arts in Scientific Illustration from University of Michigan, Scott unites scientific expertise with artistic storytelling. Throughout his career, he has led international expeditions, advanced research and conservation initiatives, and worked alongside scientists, Indigenous communities, and environmental organizations around the globe.

Zeynep Sevde

Zeynep Sevde studied Physics at Yıldız Technical University and Sociology at Boğaziçi University and Istanbul Bilgi University. She began her professional career in 2002 as a science and technology editor and went on to work as an editor, translator, reporter, and publishing director for numerous magazines, newspapers, and publishing houses.

In 2008, she turned her focus to children's literature, publishing her first children's book and founding Taze Kitap in the same year. Since then, she has become a celebrated author of children's books, including Polar Atlas, The Shy Dragon, Sleepless Koala, Green Diary, Atlas of Animals, Encyclopedia of Different Minds, What Is There on the Other Side of the World?, and Who Is There on the Other Side of the World?