

PIONEER EDITION

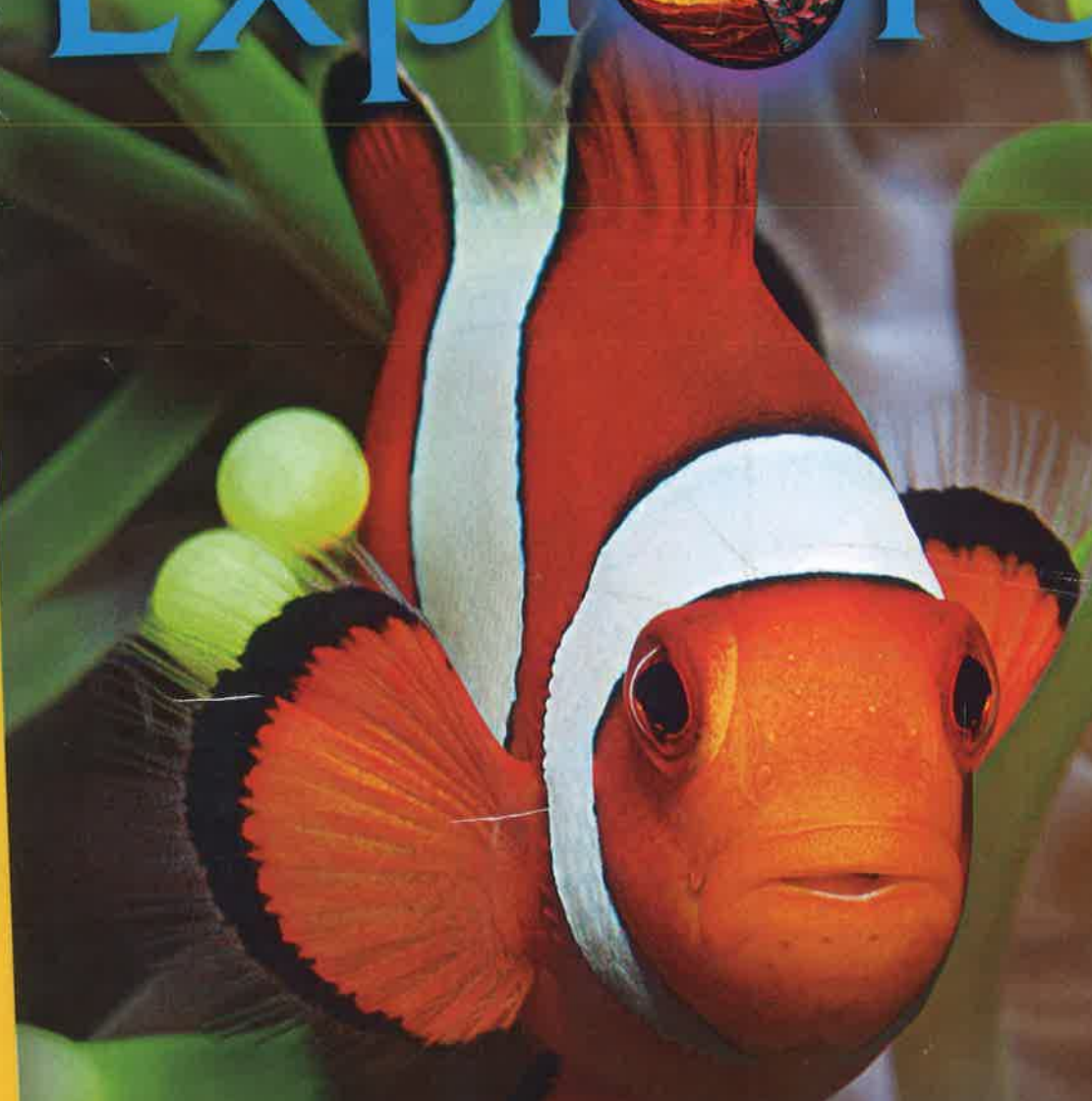
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NATIONAL GEOGRAPHIC

Explorer



Web of Life

16

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Earth Science

COMPREHENSION STRATEGY:

Before reading, preview the photos and diagrams to help you picture the information as you read.

LESSONS IN



LAVIA

Scientists climb into a volcano to reach a fiery lava lake.
Why do they do it? Is it worth the risk?

By Michael Finkel
Photographs by Carsten Peter



It takes a full day to climb up the side of the volcano. Dario Tedesco and Ken Sims stand on the edge of the crater. They are volcano scientists. They look down and see an amazing sight. Inside, a lake of **lava** crackles and pops. It is one of the largest lava lakes in the world.

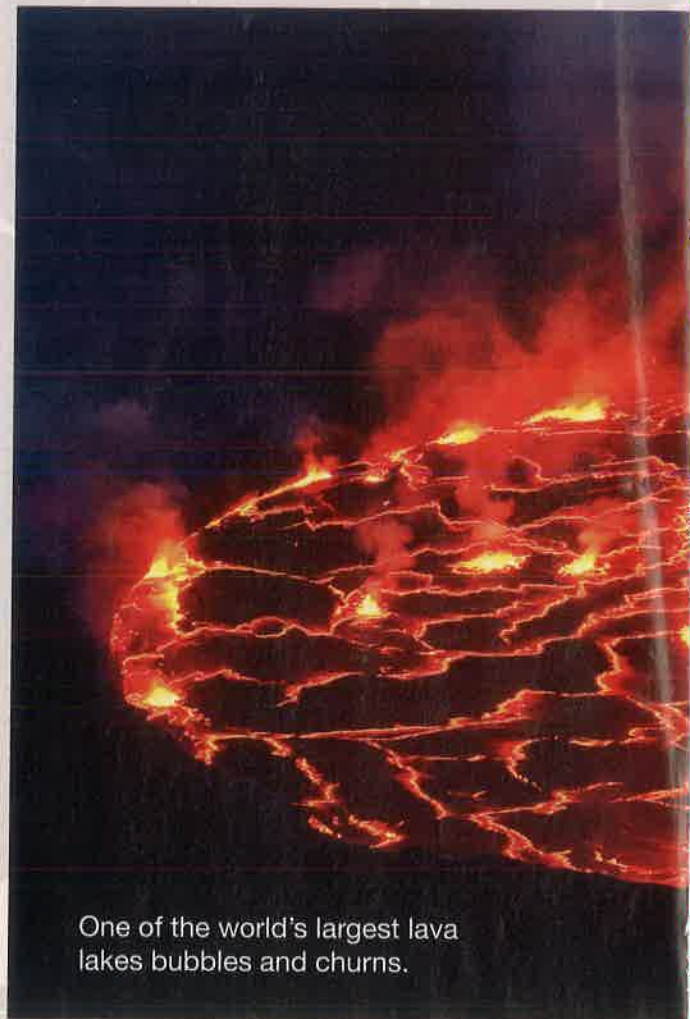
The lava is melted rock. It comes from deep inside the volcano. It bubbles and boils. It roars like a jet plane taking off. The lava shoots upward. It changes from orange to black and hardens as it cools.

Sims points down at the lake. "There," he says, "is where I'd really love to get a sample."

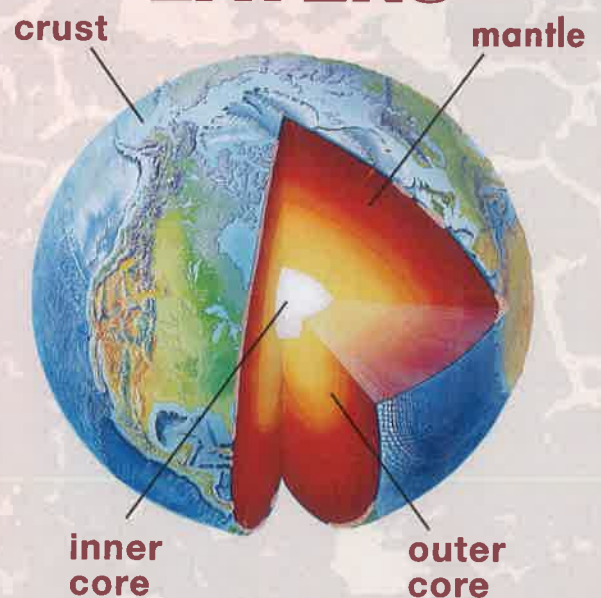
The Volcano

This volcano is called Nyiragongo. It's one of the most active volcanoes on Earth. The city of Goma sits at the base of the volcano. When the volcano erupts, the city is in great danger. That's why these scientists have come here. They want to protect the city.

Beneath Goma is a crack in Earth's **crust**. This outer layer of Earth is broken into large pieces. The pieces are called **plates**.



EARTH'S LAYERS





Moving Plates

Beneath Earth's plates lies the **mantle**. It is made up of mostly **magma**, or melted rock. Under the mantle is Earth's inner and outer **core**.

Earth's plates float on the mantle. They constantly shift and move. Some bump into each other. Some slide past each other. Other plates pull apart. Goma sits on plates that are pulling apart. When these plates shift, magma can shoot out of Earth as lava. It fills the lake.

Goma in Trouble

When the volcano erupted in 1977, the walls holding the lava lake broke. A river of lava raced down the volcano. It flowed through the city. It destroyed everything in its path.

In 2002, the volcano erupted again. Lava set fire to thousands of homes. It buried buildings. Yet these were only small eruptions. Future eruptions could be much bigger. They could do much more damage. That's why the scientists worry about Goma.



Team members prepare to climb into the crater.

Looking for Lava

When will the volcano erupt again? Sims and Tedesco want to know. To find out, they need rock and gas samples from the volcano.

What Sims wants most of all is a “zero-age sample.” A zero-age sample is a chunk of freshly hardened lava. The sample will help Sims predict the next eruption. There’s only one place to get it. It must come from near the lava lake. Getting it will be hard. Gurgling lava can shoot into the air. Sims will be in great danger.

The Journey Down

Sims’ small team starts to climb into the crater. They each wear a safety harness. They move very slowly.

Sims goes first. He attaches a rope to the rock. Then he clips his harness onto the rope. Slowly he steps down the volcano’s walls. His team follows in a single file. Loose rocks fall away beneath their feet.

They climb down until the sun begins to set. Then the team stops. They set up camp on a ledge. The lava lake glows fiery hot below them.

The team set up camp on the second ledge inside the crater.

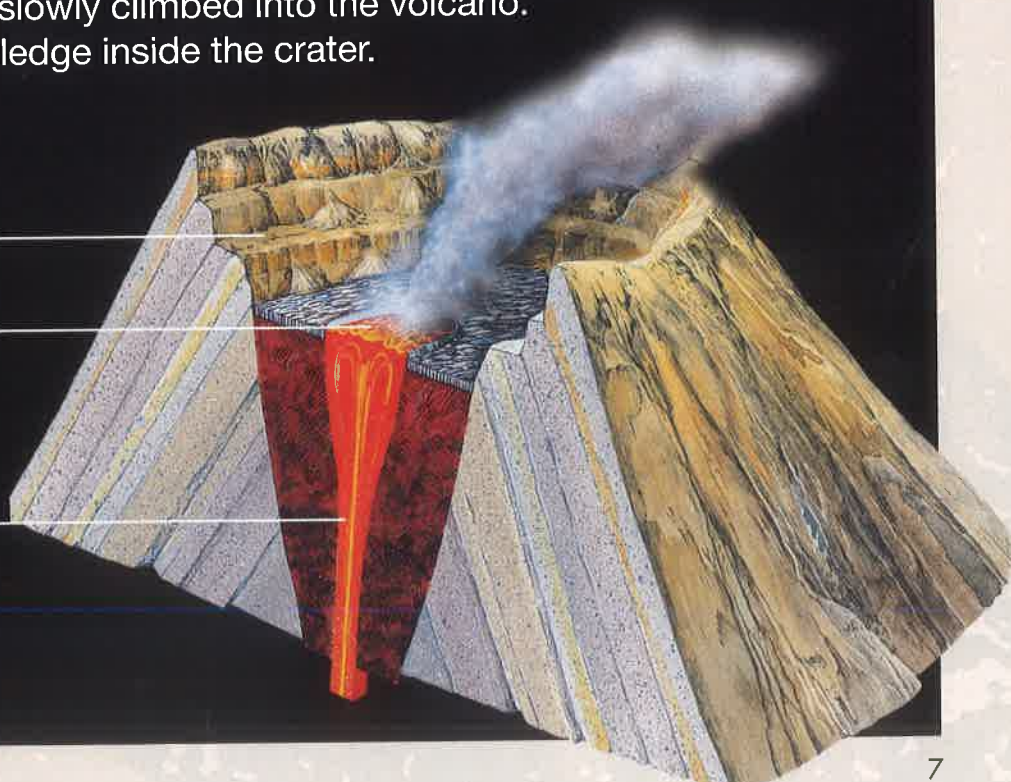
INSIDE THE VOLCANO

Sims and his team slowly climbed into the volcano. They camped on a ledge inside the crater.

campsite _____

lava lake _____

magma _____



Getting to Work

In the morning, Sims and the team get to work. They put on gas masks. The masks will protect them from toxic gases that come from the volcano.

Then they begin to collect samples. Sims thinks he is the best one to get the zero-age sample. He is a good climber. He can find the right sample, but it will be dangerous. Sims is worried. He thinks about his family. His children need him. Should he do this? In the end, he decides he must.

This suit protects a scientist from the intense heat of a volcano.



To the Lake

Sims throws his rope over the ledge. He climbs down to the crater floor. Here, he can't see the lake. The steep sides of the lake's walls block his view. He can hear the hissing gases. He can smell the bitter fumes. He can feel the terrible heat.

Sims knows he needs protection. He puts on a special suit. It will protect him from the heat. Now he begins to climb up the lake's wall. His foot slips. He smells burning rubber. One of his shoes is melting.

Beating the Odds

Sims keeps going. He peeks over a ridge of freshly hardened lava. The boiling lava lake bubbles below. Steady now. Steady. He slams his fist into the hardened lava. A piece breaks off. He grabs his sample. Success!

Sims risked his life, but it was worth it. What he holds could save many lives. He looks at the hot rock in his hands. It isn't enough. Days of hard work still lie ahead.

He starts to climb back up. He thinks, "*Now it's time for us to get to work.*"

Wordwise

core: the center of Earth

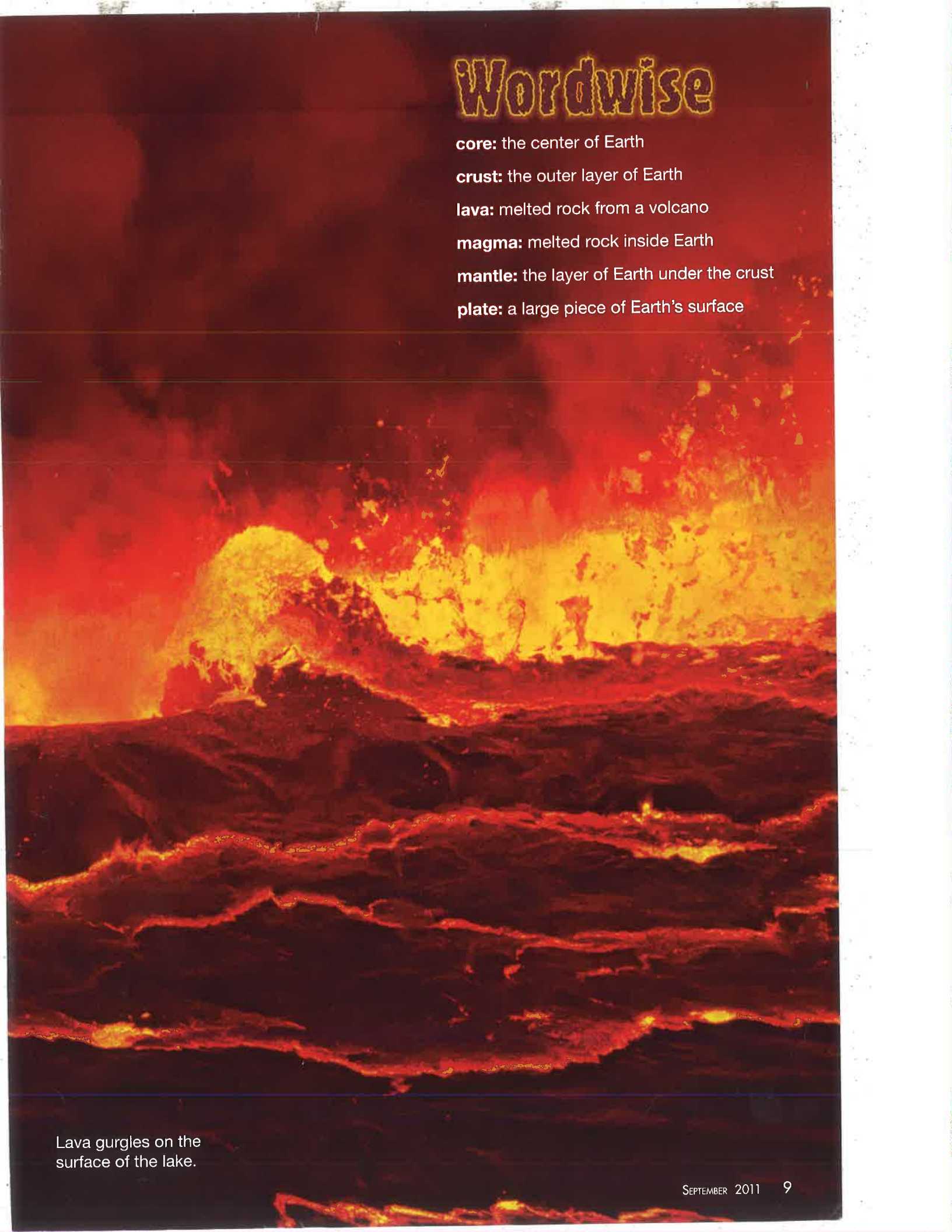
crust: the outer layer of Earth

lava: melted rock from a volcano

magma: melted rock inside Earth

mantle: the layer of Earth under the crust

plate: a large piece of Earth's surface



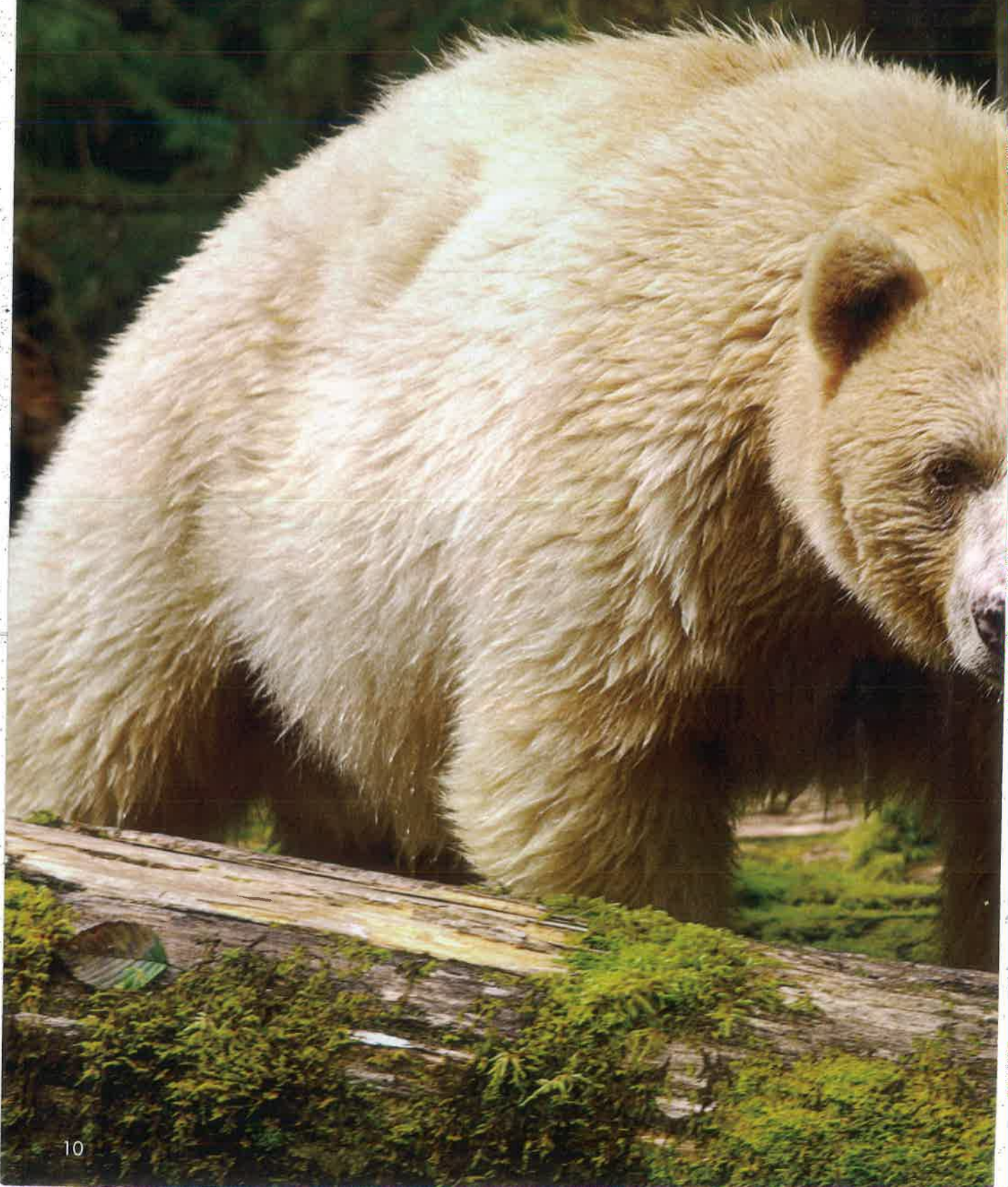
Lava gurgles on the surface of the lake.

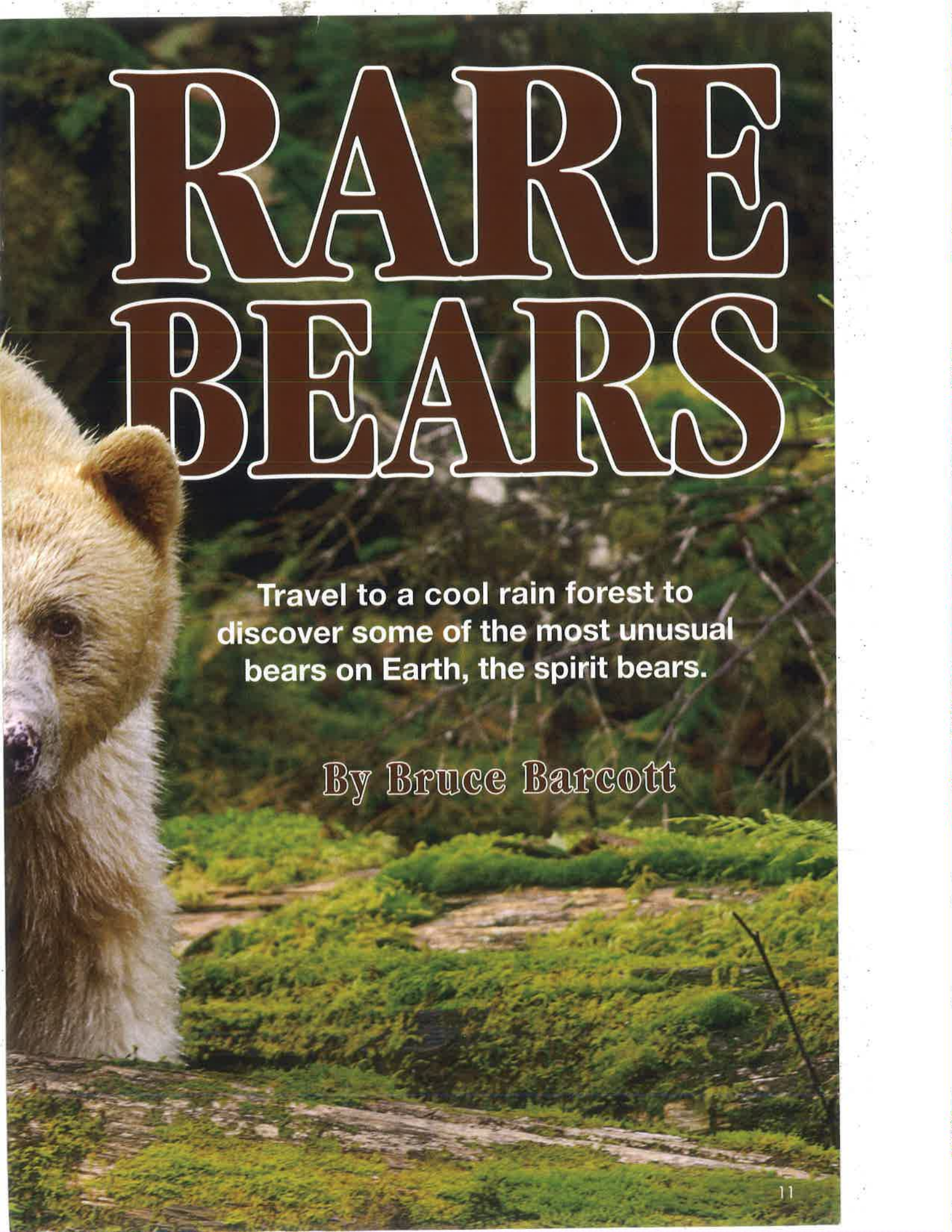


Life Science

COMPREHENSION STRATEGY:

As you read, think about what you already know about the topic. Is any of the information in this article familiar?



A photograph of a white bear, likely a spirit bear, in a lush rainforest. The bear is on the left side of the frame, looking towards the right. The background is filled with dense green foliage and trees. The title 'RARE BEARS' is overlaid on the top half of the image in a large, brown, outlined font.

RARE BEARS

Travel to a cool rain forest to discover some of the most unusual bears on Earth, the spirit bears.

By Bruce Barcott



A spirit bear sniffs the air. It can smell food and danger from a long distance.

No roads lead to where I'm going in the Great Bear Rainforest. To get there, I fly in a tiny seaplane. Splash! It lands on a river that cuts through the forest. Out my window, I see a thick forest, steep mountains, and no trails. I start to worry. It could be hard to find what I am looking for.

Wet Walk

I'm in the rain forest working for NATIONAL GEOGRAPHIC. I'm searching for a very rare bear. It's a black bear with white fur. It's called a Kermode bear. The people who live here call it a spirit bear. It slips through the forest like a ghost.

To find spirit bears, I've traveled to a really cool rain forest. When I say cool, I mean chilly. Rain forests near the Equator are hot and wet. This rain forest is on Canada's west coast. It is cool and wet. My feet slip on mud and wet moss.

My guide and I look for unusual wildlife. I see 1,000 year-old trees. I see big yellow slugs. I look for wolves. The wolves here don't always hunt on land. Instead, they wait by streams. They catch jumping fish in their teeth.



On the Lookout

The spirit bear may be the most unusual creature living here. It is also hard to find. For days, we hike and hunt. Finally, my guide sees something. It's a bit of chewed up bark. A bear's been here, he tells me. Was it a spirit bear? A fuzz of creamy fur is stuck to a nearby branch. Yes!

The bear may return. We sit on a rock to wait. I try not to make a sound. We wait a long time. I see a bush shake. A spirit bear steps out of the woods. It sniffs the air. Then it slips back into the forest.


Fish Feast

Two days pass. Then I see another spirit bear. It stands in a stream and stares into the water. Suddenly, it pounces. Water splashes. A fat salmon wriggles in its claws. The bear carries it into the forest. I wait. Soon, the bear comes back. It returns again and again. It catches 10 salmon.

My guide tells me a story. One afternoon he saw a spirit bear catch 80 salmon. Spirit bears are **omnivores**. They also eat grass, berries, and insects, but guess what? Salmon is their favorite food.

Dinner time! A spirit bear pins a wriggling salmon under its paw.





A spirit bear leads her cub across a log. Unlike its mom, the cub has black fur.

Being a Bear

During the fall, the bears eat and eat. They need the extra fat to survive the winter. Bears **hibernate** in winter. They become less active. They crawl into snug, dry dens and sleep. They may not eat for months.

Some females even give birth to cubs. In the spring, the cubs follow their mother out of the den.

It can be an odd sight. A white bear may have a cub with black fur. A bear with black fur may have a cub with white fur. The cubs act just like their mothers. The only difference is their fur color.

All in the Family

A bear's white fur is a **trait**. A trait is something passed down from parent to **offspring**, or baby. A parent may have a trait that does not show. The parent can still pass it on to the baby. That's why a mother and her cubs can look different.

Traits can sometimes help an animal survive. Long ago, this place was covered in ice. White bears blended in. Now it's a rain forest and green. Yet, the black bears here still have the old trait. Their cubs can still have white fur.

Secrets of Success

Spirit bears no longer need white fur to help them hide. White doesn't blend into the green forest. Yet, white fur could still be helpful. It may help the bear to catch more fish.

Imagine a salmon swimming in a river. It can't see a spirit bear's white paw coming down on it. The paw blends into the cloudy sky.

White fur also protects spirit bears from humans. The people who live in the forest think the spirit bears are special. For a long time they kept the bears a secret. Hunters didn't know about them. That saved many spirit bears' lives.

Protector of the Forest

Today, more people know about the spirit bear. That's okay. Many people want to protect the bears. Now it's against the law to hunt them. Laws also protect their forest habitat.

Some people call spirit bears an "umbrella species." If the bears are protected, the forest is protected. That means other creatures in the forest are protected, too.

I was excited to see two spirit bears. Now I must leave. I'll be back. I want to see the spirit of this forest again.

Read more about spirit bears in the August 2011 issue of NATIONAL GEOGRAPHIC.

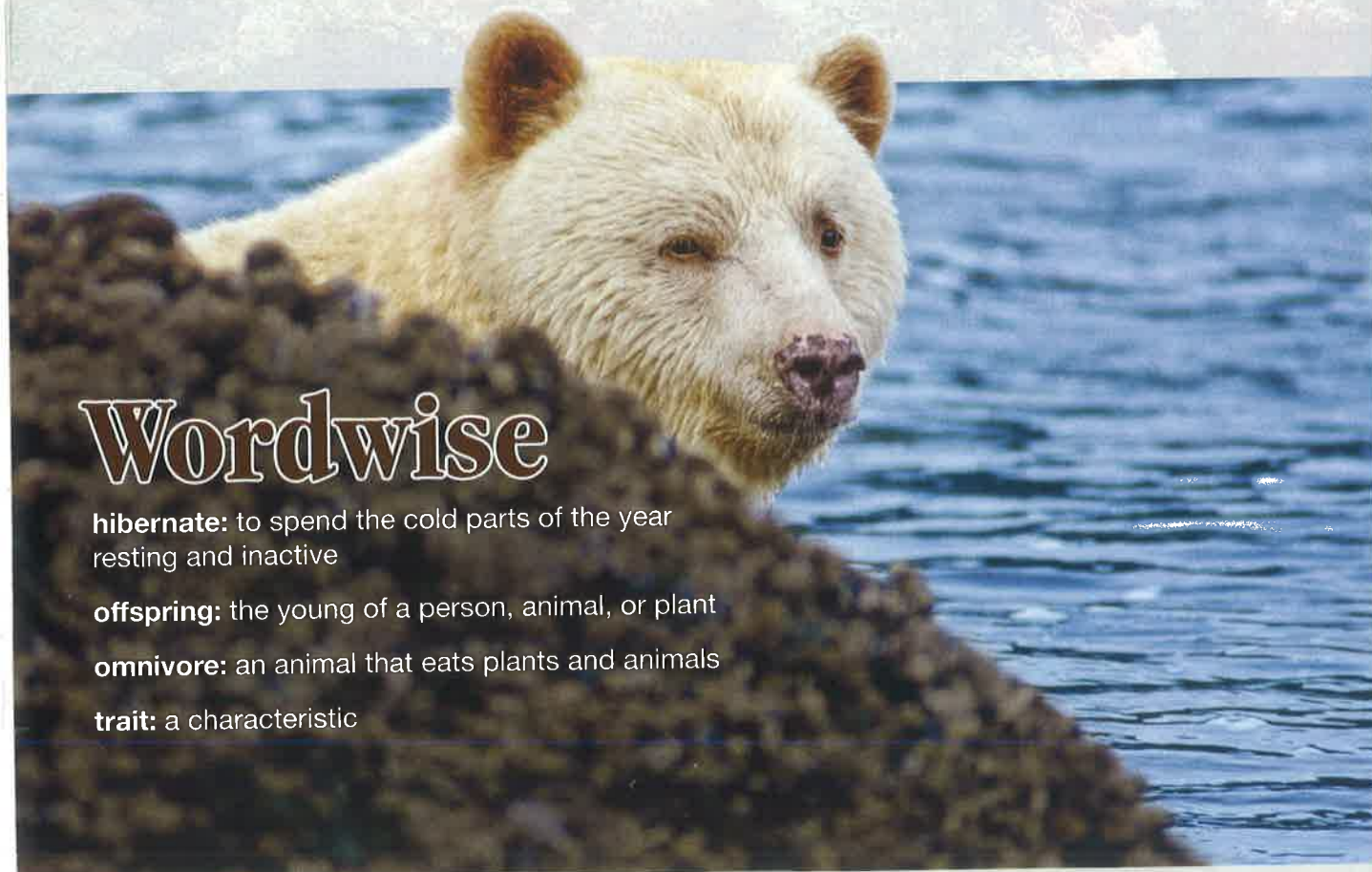
Wordwise

hibernate: to spend the cold parts of the year resting and inactive

offspring: the young of a person, animal, or plant

omnivore: an animal that eats plants and animals

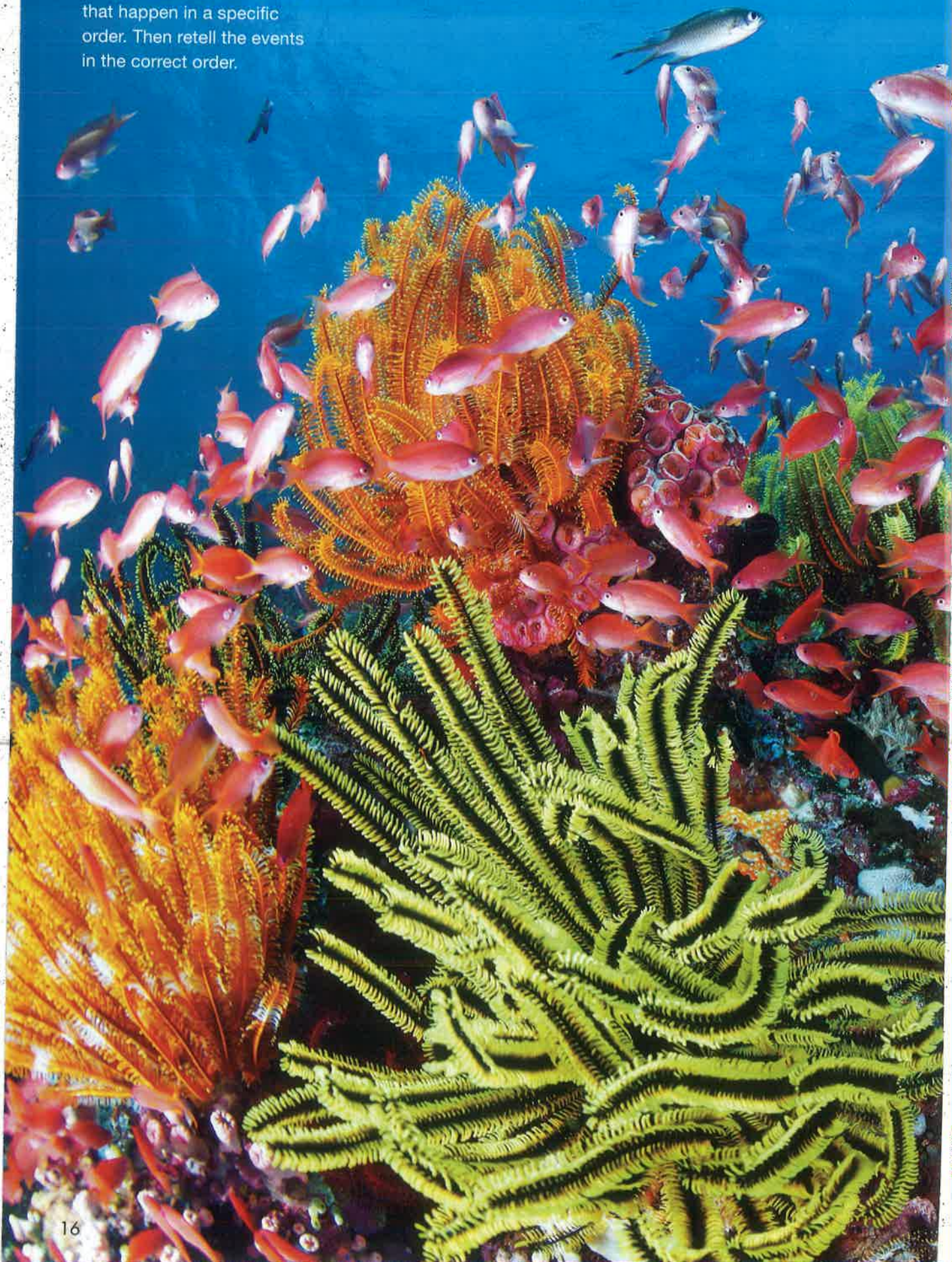
trait: a characteristic



Life Science

COMPREHENSION STRATEGY:

As you read, look for events that happen in a specific order. Then retell the events in the correct order.



In the Great Barrier Reef,
tiny corals are part of a

Web of Life

by Gary Miller