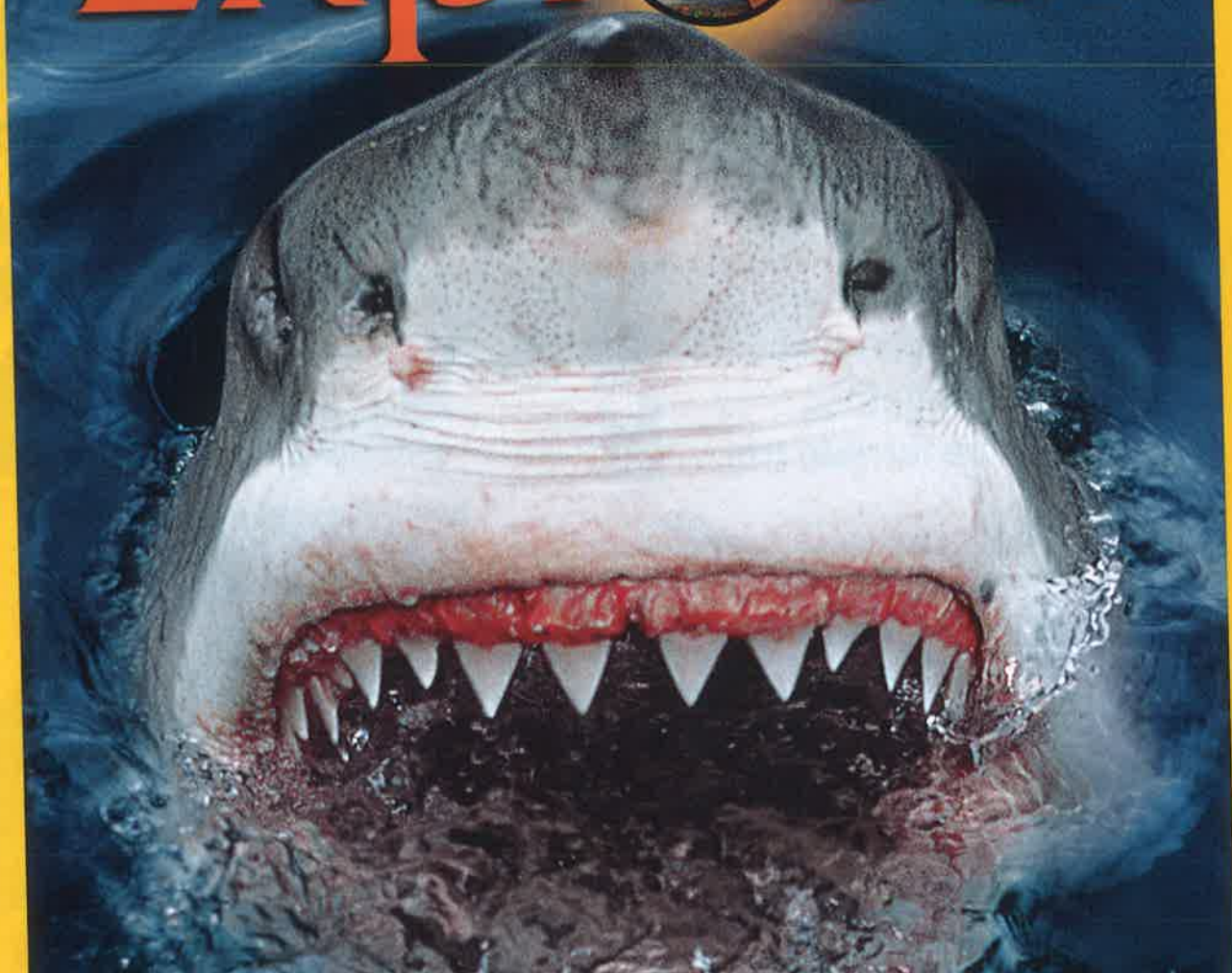
PATHFINDER EDITION NGPATHFINDER.ORG OCTOBER 2012

NATIONAL GEOGRAPHIC

Explorer



DEADLIEST PREDATORS 2

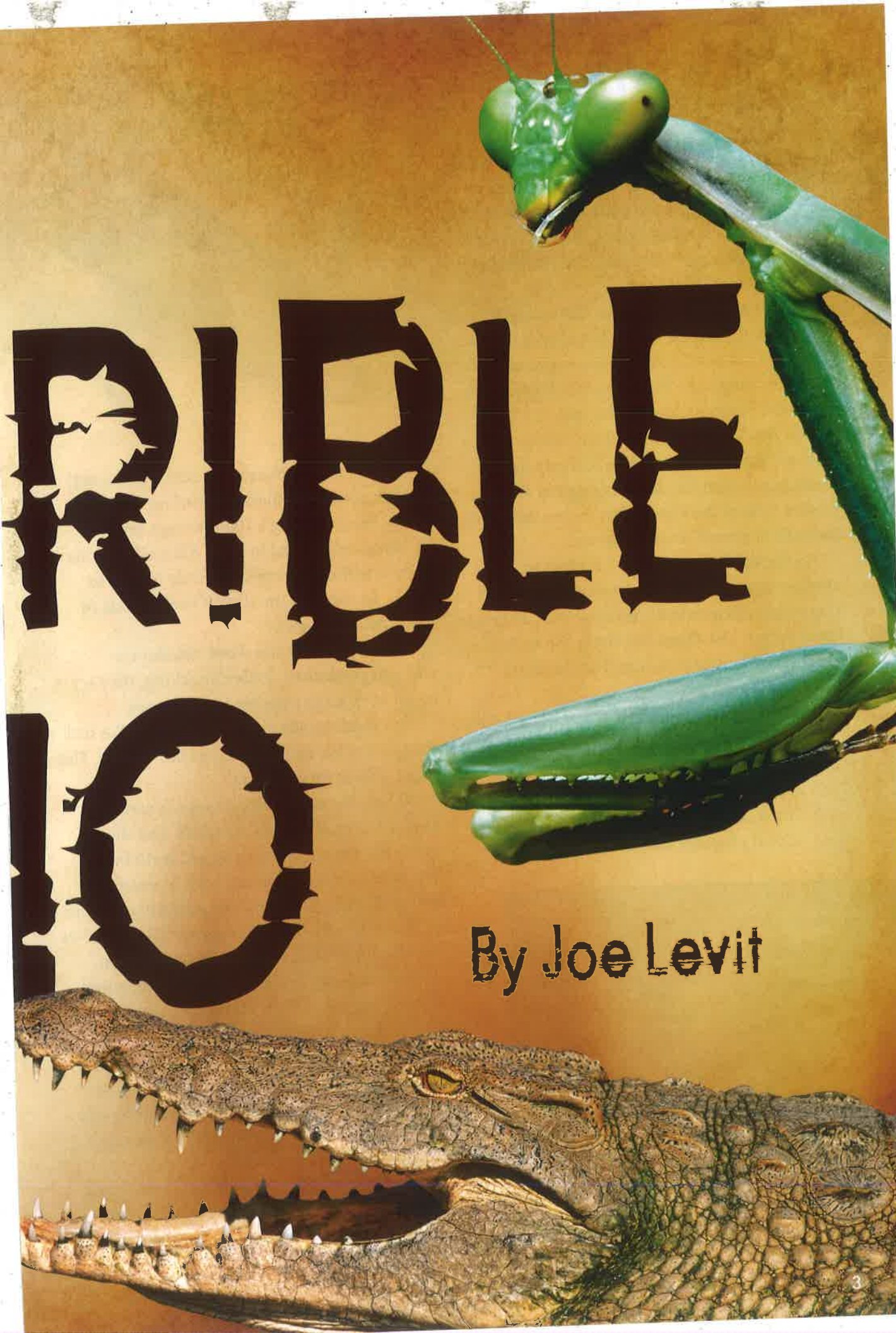
Volcanoes 10 Leaves 18

Life Science

COMPREHENSION STRATEGY:
As you read, think about what the writer is trying to say.

TERRIFIER

Meet three of the world's deadliest predators. One has teeth like steak knives. One has a death roll. The last one can tear off heads! Together, they are the terrible trio.


RIBLE
IO
By Joe Levit

The Great White Shark

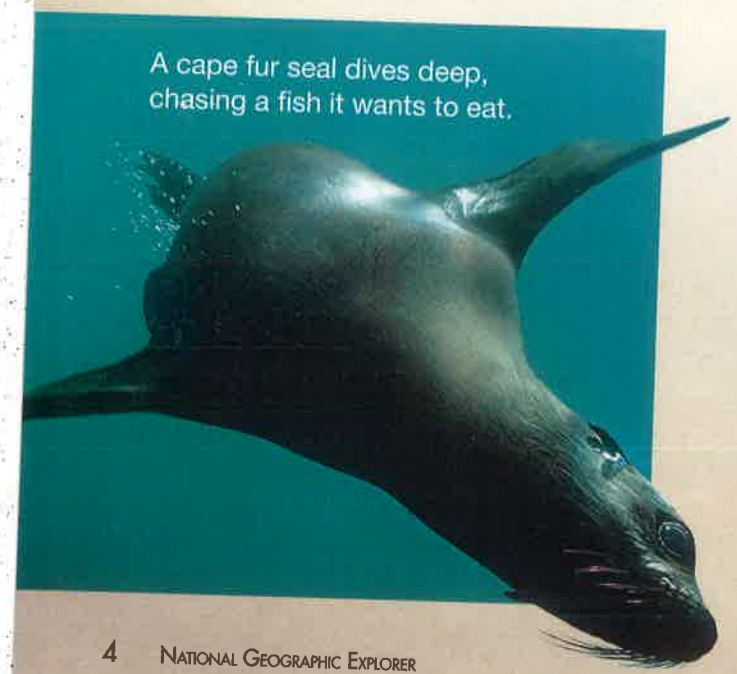
A cape fur seal leaps from the edge of the rocky island. It plunges into the crystal blue water. The sunlit waters grow darker as the seal dives deeper. Large clumps of thick seaweed block its path. It dips and spins past the seaweed as it looks for small fish to eat.

Not far away, a great white shark senses that the seal is in the water. The shark's skin is sensitive. It senses the movement made by the swimming seal. The shark quickly changes direction. It swims toward the seal.

The shark turns its head from side to side. This movement travels down its body until it reaches the tail fin. Its swishing tail fin pushes against the water. This moves the shark forward. It speeds toward the seal.

As the shark swims closer, it picks up another signal. Every living creature gives off tiny pulses of electricity. Moving muscles create these pulses. The shark can sense the seal's heartbeat. The signal is faint, but the shark follows it.

As the shark swims, water flows in and out of its nostrils. Now it can smell the seal. Once it catches a whiff of the seal, the shark zigs and then zags. Its head swings from side to side. It sniffs the water with one nostril, then the other. This helps it pinpoint the seal.



A cape fur seal dives deep, chasing a fish it wants to eat.

Finally, the shark sees the seal. Yet the seal doesn't notice the shark swimming toward it. It's too busy chasing a fish through seaweed.

The shark is hard to spot. After all, only its belly is white. The top of its body is gray to black. To the seal, the shark's back blends in with the dark water.

This is good for the shark. Sharks are ambush **predators.** Before attacking, they try to get as close as possible to their **prey.**

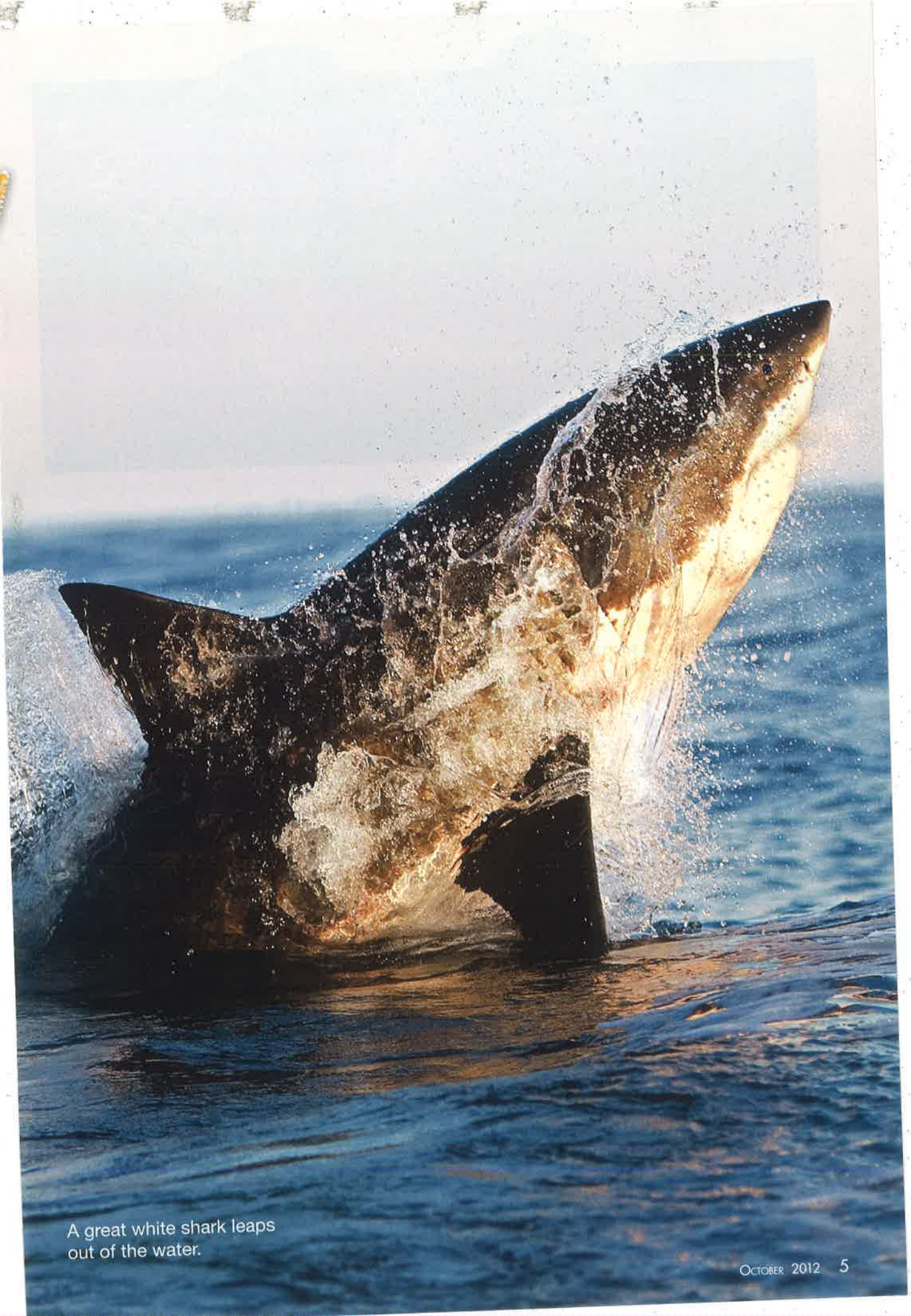
The shark swims closer to the seal. The seal catches its fish and races up to the surface. The shark speeds up to follow.

At last, the seal senses danger. It turns its head to look over its shoulder. The shark opens its mouth. Rows of jagged teeth look like knives. The frantic seal tries to escape by swimming faster. Yet few animals can outswim a great white shark. With a powerful push of its tail, the shark closes the gap between them.

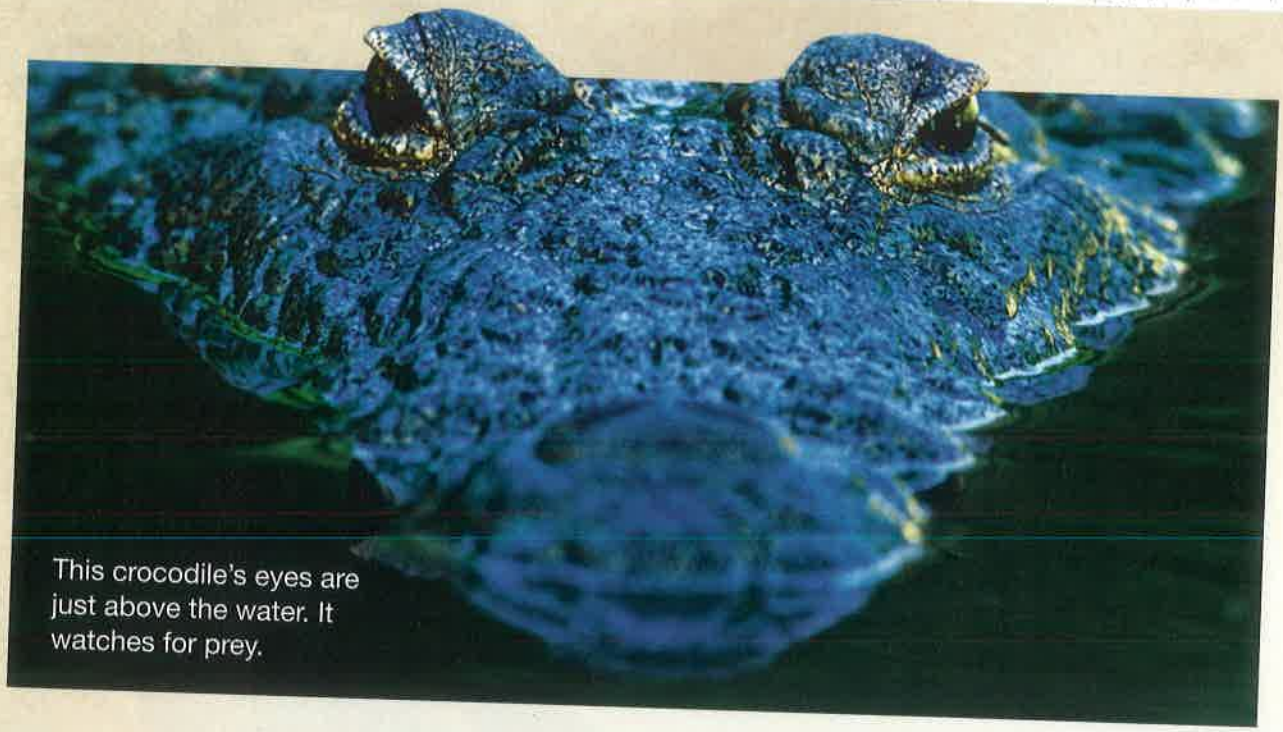
Both seal and shark burst out of the water and spring into the air. The shark snaps its jaws shut, but it just misses the seal's tail.

The seal twists its body in midair as the shark falls back into the water. The seal dives back into the sea headfirst. It swims away in a zigzag pattern, putting as much distance as it can between itself and the shark.

The shark breaks off its attack. Even a great hunter like the great white shark misses once in a while. The shark sinks to the depths again to look for other prey.



A great white shark leaps out of the water.



This crocodile's eyes are just above the water. It watches for prey.

THE CROCODILE

A crocodile sits on a riverbank. The hot sun warms its dark, scaly skin. The crocodile sits very still. It sees a **herd** of wildebeests on the other side of the river. They are on the move.

The wildebeests thunder by with pounding hooves. A dusty cloud is kicked up by each hoof. Thirsty, the wildebeests stop by the river's edge. They gulp mouthfuls of water.

Unnoticed, the crocodile slips into the water without a sound. It holds its legs close to its sides. Its powerful tail quietly swishes back and forth. Slowly, the crocodile glides forward. Most of its body is hidden under the water. Above the water, its eyes, ears, and nose can see, hear, and smell the herd.

Some members of the herd have had enough to drink. They're ready to cross the river and move on. Wildebeests travel together by **instinct,** and it's important that they stay together. They find safety in numbers.

If the wildebeests move together, a predator will have a harder time attacking one of them. Staying close to each other, they line up single file. The wildebeests step into the river and begin to wade across.

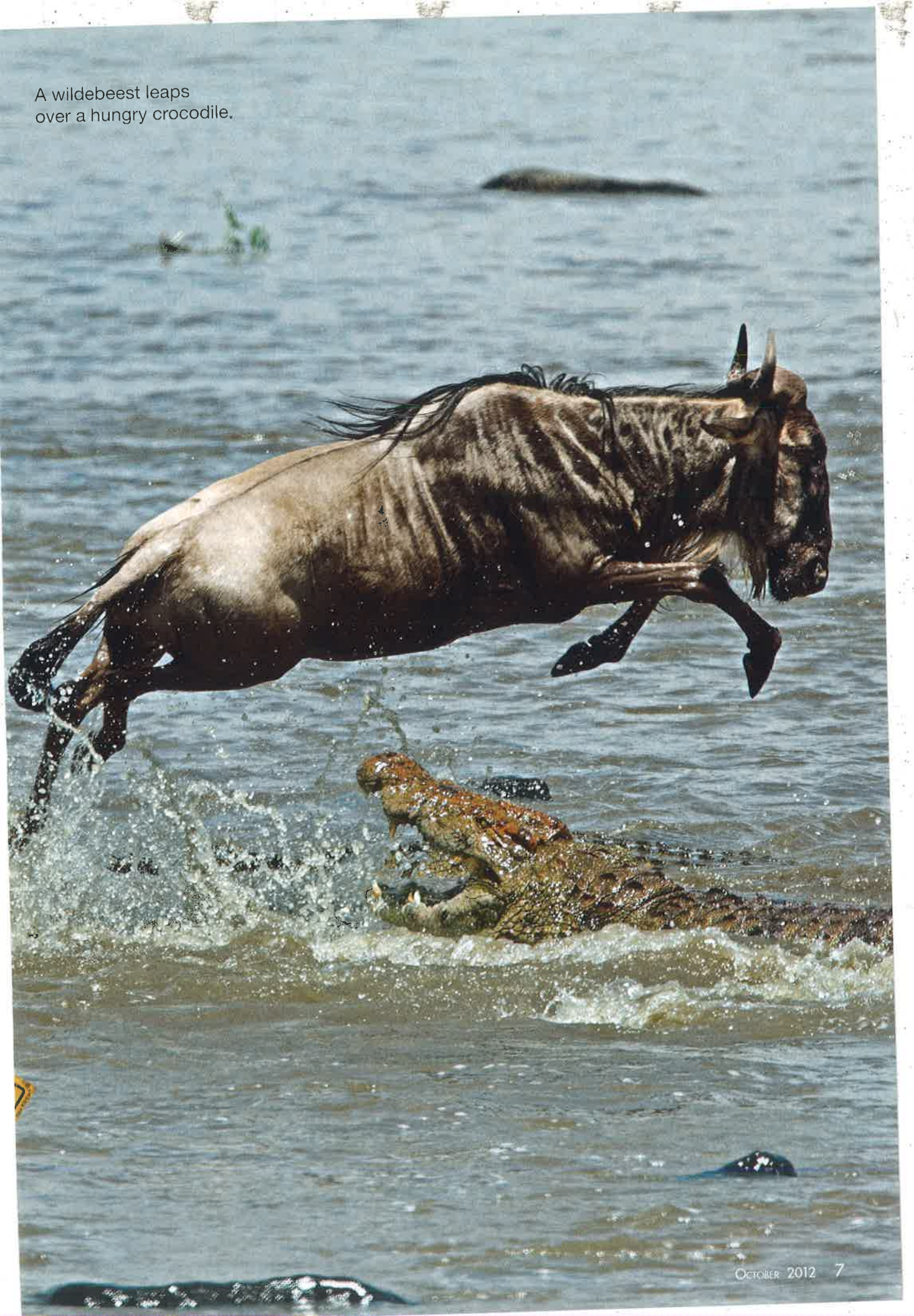
The crocodile stops swimming. It floats like a log into the path of the wildebeests.

The line of wildebeests is now within the crocodile's reach. The crocodile stays still. The first wildebeest passes it. Then another and another. The crocodile waits for just the right moment. Suddenly, it springs forward. Its open jaws snap down on one of the smaller animals with bone-crushing force. The crocodile then drags the wildebeest toward deeper water.

The crocodile uses its instincts to close flaps on its nose. It also closes a flap in the back of its throat. Then it rolls and rolls and rolls. This is called a death roll, and for good reason. The wildebeest drowns.

Then the crocodile drags the wildebeest's body to the river bottom. There, a fallen tree lies stuck in the muddy bank. The crocodile wedges the wildebeest's body under the tree trunk. Then the crocodile swims back up to the surface.

The crocodile will come back later to eat its prey. The rest of the wildebeests have crossed the river. They huddle together on the other side, a safe distance from the reptile. They will stick close together.



A wildebeest leaps
over a hungry crocodile.

THE PRAYING MANTIS

It's a cool summer evening. A female praying mantis sits motionless in a bush. She has been here for a long time now. Her thin, green body blends in with the leaves around her. Her long arms are folded neatly together in front of her.

Thwack! She turns her head toward the sound. A large cricket made the noise as it landed on the bush. The cricket begins to nibble the edges of the bush's leaves. It is not aware of the killer on the branches below it.

The praying mantis waits for the cricket to come to her. Then the praying mantis lashes out with her front legs. She moves twice as fast as the blink of an eye.

Rows of sharp spikes on her front legs spear the cricket. The cricket kicks wildly to escape. It can't. The praying mantis has it pinned down. Then she leans forward and chomps off the cricket's head.

The cricket stops moving. The praying mantis eats her meal peacefully.

As fierce as praying mantises are, they are not without enemies. The praying mantis finishes her meal and is ready to rest. Yet an Asian giant hornet has other plans for her. The giant hornet is a mantis killer.

The praying mantis sees the hornet coming. She spreads her wings to make herself seem larger. The praying mantis lifts her front legs and waves them in a threatening way. The hornet comes closer. The praying mantis hisses.

The hornet charges. The praying mantis reaches out her front legs to grab the hornet with her pinchers. They bounce off the hornet's tough exoskeleton. The hornet wriggles free.

The hornet flies over the praying mantis. Then it dives down and stings the praying mantis on the back. It stings again. This is one of the hornet's best weapons. It can strike over and over without losing its stinger.

At the same time, the hornet bites the praying mantis. Its jaws are like steel cutters. The praying mantis bucks and kicks. She tries to flip the hornet off of her back. The hornet bites and stings until the praying mantis stops moving. Moments ago, the praying mantis was the predator. Now, the predator is the prey.

The praying mantis, the crocodile, and the great white shark are some of the most feared predators in the animal kingdom. No matter how good a hunter these animals are, though, they don't always catch their prey. And in some cases, they end up becoming prey.

WORDWISE

herd: a group of animals of one kind

instinct: a behavior an animal is born with

predator: an animal that kills and eats other animals

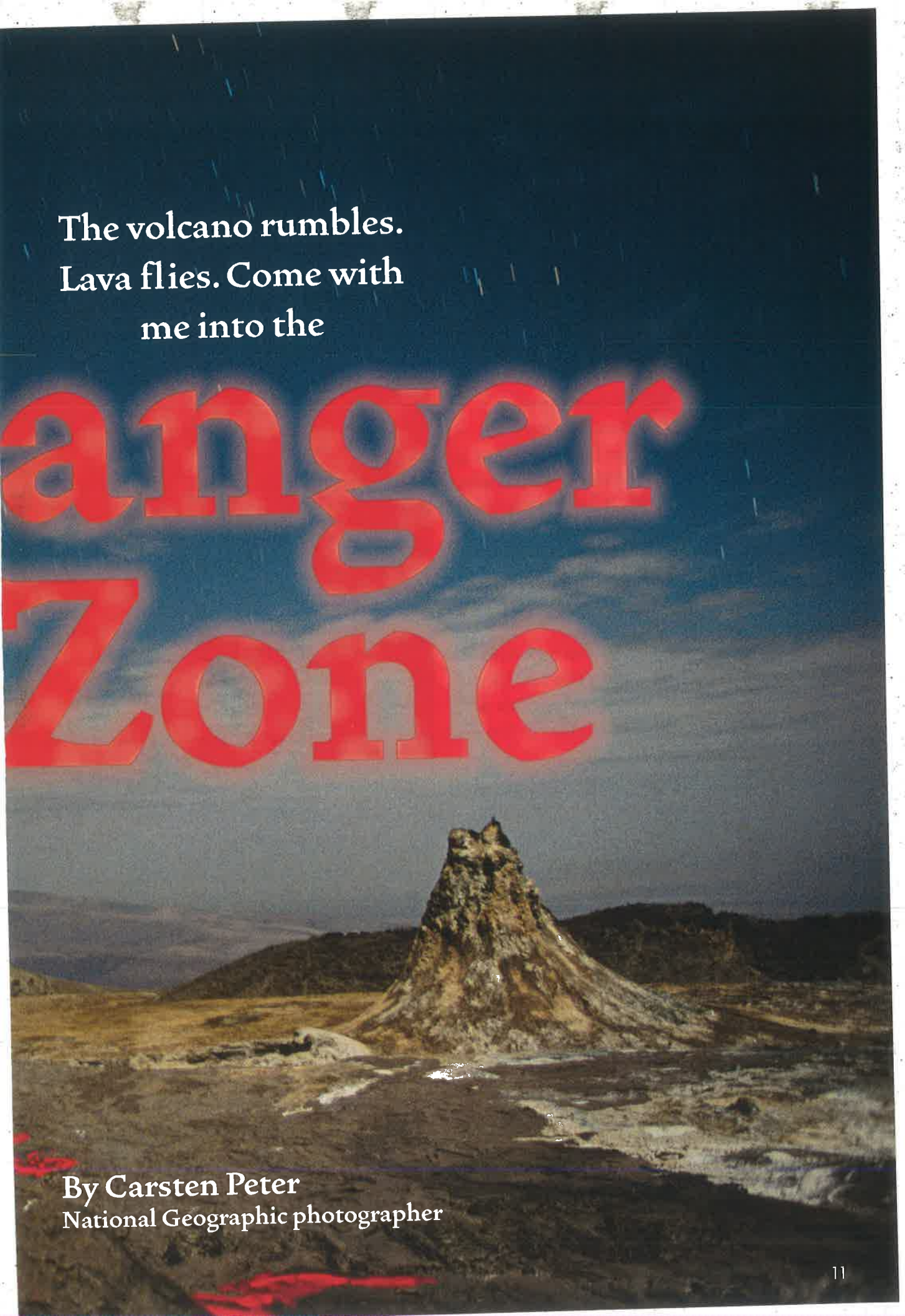
prey: an animal hunted or caught by another animal for food

A praying mantis holds still as it looks for prey.

This praying mantis nibbles on her prey.

Earth Science

COMPREHENSION STRATEGY:
As you read, use the words and photos to picture what is happening.



The volcano rumbles. Lava flies. Come with me into the

anger Zone

By Carsten Peter
National Geographic photographer

The ground shakes. Suddenly, it cracks open. The crack is right under my camera gear. I grab it just in time! Moments later, hot **lava** shoots out of the crack. It flies into the air and lands with a splatter.

I'm used to such close calls. I'm a National Geographic photographer. To get the perfect shot, I go to some of the most dangerous places on Earth. There's nothing I love more than coming face-to-face with an active volcano.

I've crawled into active craters. I've dodged globs of erupting lava. I've stood on the edge of boiling lava lakes.

It thrills me to think of where the lava comes from. This hot, melted rock starts as **magma** flowing deep inside Earth. It pushes up through cracks in Earth's **crust.** After it erupts, the lava hardens into rock. It builds volcanoes.

To me, volcanoes aren't just mountains of rock. When I'm standing on the edge of one, it feels like Earth is alive under my feet. The sound of lava hissing, crackling, and popping is music to me.

I've explored volcanoes all over the world. My favorite volcano might surprise you. It's not the most dangerous one. It doesn't explode with huge fountains of lava. In fact, it may be the strangest volcano on Earth.

This volcano in Tanzania looks like a pyramid. It's called a stratovolcano.

Getting There

To get to this volcano, my team and I fly to Tanzania. It's a country in Africa. Then we hop into a 4-wheel-drive vehicle for a day of hard driving. First, we cross a vast valley. It's hot, dry, and dangerous. Whirlwinds of dust called dust devils swirl in the distance.

When we reach a dry riverbed, the car ride suddenly gets extra bumpy. This isn't good. We have a flat tire, and we're stuck in a bad place.

The driver nervously looks out for lions. He keeps an eye on the sky, too. A sudden storm could cause a flash flood and wash us away.

The spare tire is bad, too. So we're stuck until morning. Finally, we get going again. This valley seems to go on and on. That's because it's not just any valley.

Magma Rising

Here, two giant pieces of Earth's crust slowly pull apart. This action creates a giant **rift,** or gap. The movement weakens Earth's crust. That makes it easier for magma to bubble up here than in other places. Once magma reaches the surface, it's called lava. In spots, lava erupts through cracks in the crust.

I see proof of that in the distance. A big mountain pokes above the valley floor. It's the volcano. From far away, it looks like a typical stratovolcano. It's shaped like a pyramid.

This volcano may have started to form 700,000 years ago. With each eruption, lava flowed and hardened. Then ash settled on top of it. Layer by layer, the volcano grew. Now its steep sides rise nearly 3,000 meters (9,700 feet).


See what happens
Inside a Volcano
crater
vents
lava flows
magma rises
magma chamber

Slip and Slide

We drive as close to the top of the volcano as we can. We have to hike the rest of the way up. We grab all our gear and get started. It's not easy. Thick dust covers the volcano's slopes, so each time I take a step up, my foot slides partway back. I take another step and slide again. I've moved up, but barely.

I don't mind. This slippery slope is just the first sign that this volcano is a little strange. It's made of hardened lava like other volcanoes. Yet this rock is more crumbly.

My team and I make it to the top. We've reached the volcano's crater, or its opening. Here's where the lava spills out of the ground. It rises up through vents, or hollow tunnels inside the volcano. Then it bubbles, flows, and even blasts out.

Rock Art

The inside of this crater looks like no place else on Earth. In fact, I feel like I've landed on another planet. I've never seen anything like it.

Wild rock shapes rise from the crater floor. One looks like a giant wing. It formed when lava spurted straight up out of a vent like a fountain. Then the lava hardened before it could hit the ground.

I see small, domed mountains and tall, skinny chimneys. Some chimneys spit lava into the air. The lava turns foamy in midair, and then it hardens. It looks like silver glitter as it clatters to the ground.

We set up camp nearby. Later that night, I return to the edge of the crater. It looks eerie. The rocks seem to glow. Faint green flames spurt from some of the tall chimneys.

Lava hardens in the shape of a wing.

Looking for Lava

I want to race into the crater to take pictures. I don't, though. I need to wait and watch to make sure it's safe.

So first I search for signs of hot lava. It can be hard to spot. That's another way that this volcano is different from other ones.

In most volcanoes, the lava is so hot that it glows red as it gushes out of the ground. You often can see thick, red globs of hot lava as it spills out of the crater and slowly oozes across the ground. As it cools, this kind of lava turns into a hard, black rock.

The lava I see spurting out of this volcano isn't like that. I spot some flowing across the ground. It moves quickly in a thin stream no wider than my arm.

It's as runny as oil. It's also black, not red. That's because, for lava, it's fairly cool. It's only about 550° Celsius (1,000° Fahrenheit) when it first comes out of the ground. Red-hot lava is twice as hot. Still, I know the danger is very real. This lava is still hot enough to burn holes in my gear.


Hot lava sputters and
flows like runny oil.

Lava to Ash

The lava here is different in another way, too. Most cooled lava turns into hard rock and stays hard for a long time.

This lava doesn't. After it cools, it can fall apart easily. All it takes is a little moisture. That's because the mix of ingredients in this lava is unusual. It has more carbon dioxide and sodium in it than most other lavas.

These ingredients react when they come into contact with water. Within days, the cooled lava turns from muddy black to silvery gray, then snowy white. It becomes a kind of powdery salt that looks like snow.

This ash covers the volcano. In some places, it's many centimeters thick. It coats my boots and blows into my eyes. It also washes into the valley below and flows into a lake.

The ash helps make the lake super salty. It's so salty, little can live in this water. A kind of algae thrives, though. It turns the lake bright red. Flamingos flock to the lake to eat the algae. The birds are beautiful.

Up Close

To me, though, the lava is even more beautiful. Now that I know where it's safe to walk, it's time to explore and take photos.

I head to a dome and climb it. I hear a faint sputter of magma under my feet. It doesn't seem too dangerous.

A little later, I learn how wrong I am. I'm exploring another part of the crater when I hear a loud noise.

Bang! A dome bursts. Lava gushes out. It quickly flows across the crater.

Luckily, no one is in the lava's path. I take it as a warning. This volcano can turn dangerous in a split second. I always need to be careful.

I am careful as I climb one of the chimneys. Even so, pieces of rock break off in my hands. The whole rock formation shakes. I can hear magma rumbling. My heart pounds. I know there's only a layer of crumbly rock between danger and me. It's too risky, even for me. So I climb back down.

Always Changing

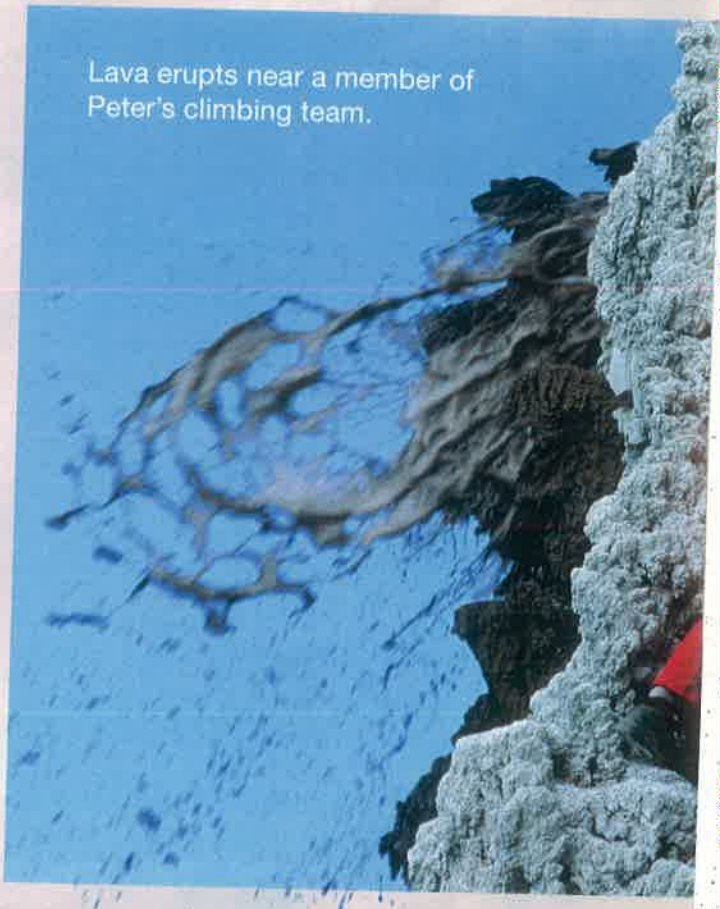
One night, the volcano rumbles so much that I can't sleep. Instead, I climb close to an erupting chimney and take photos all night.

After a week here, it's time to leave. I hate to go. I want to remember every moment. So I stand on the edge of the crater, close my eyes, and listen. The vibrating ground rumbles. The bubbling magma gurgles. The flowing lava roars. The cooling lava crackles. To me, it sounds like glass cups clinking together.

Then I open my eyes and take a last look. By the time I return, this volcano will look different. Already, the rock shaped like a wing has crumbled. It was there one minute. Then poof! It shattered and was gone.

I know this odd volcano will keep changing. Domes will collapse, sending new rivers of black lava flowing across the crater. Lava will spurt and gush, making new shapes.

That makes me want to come back. I want to listen to this volcano's music again. I want my photos to capture its features forever.



Lava erupts near a member of Peter's climbing team.

Wordwise

crust: the surface, or top layer, of Earth

lava: melted rock that flows from a volcano

magma: partly melted rock inside Earth

rift: a place where two huge pieces of Earth's crust pull apart, creating a gap

The volcano ash makes Lake Natron too salty for most life. This red algae likes it, though.