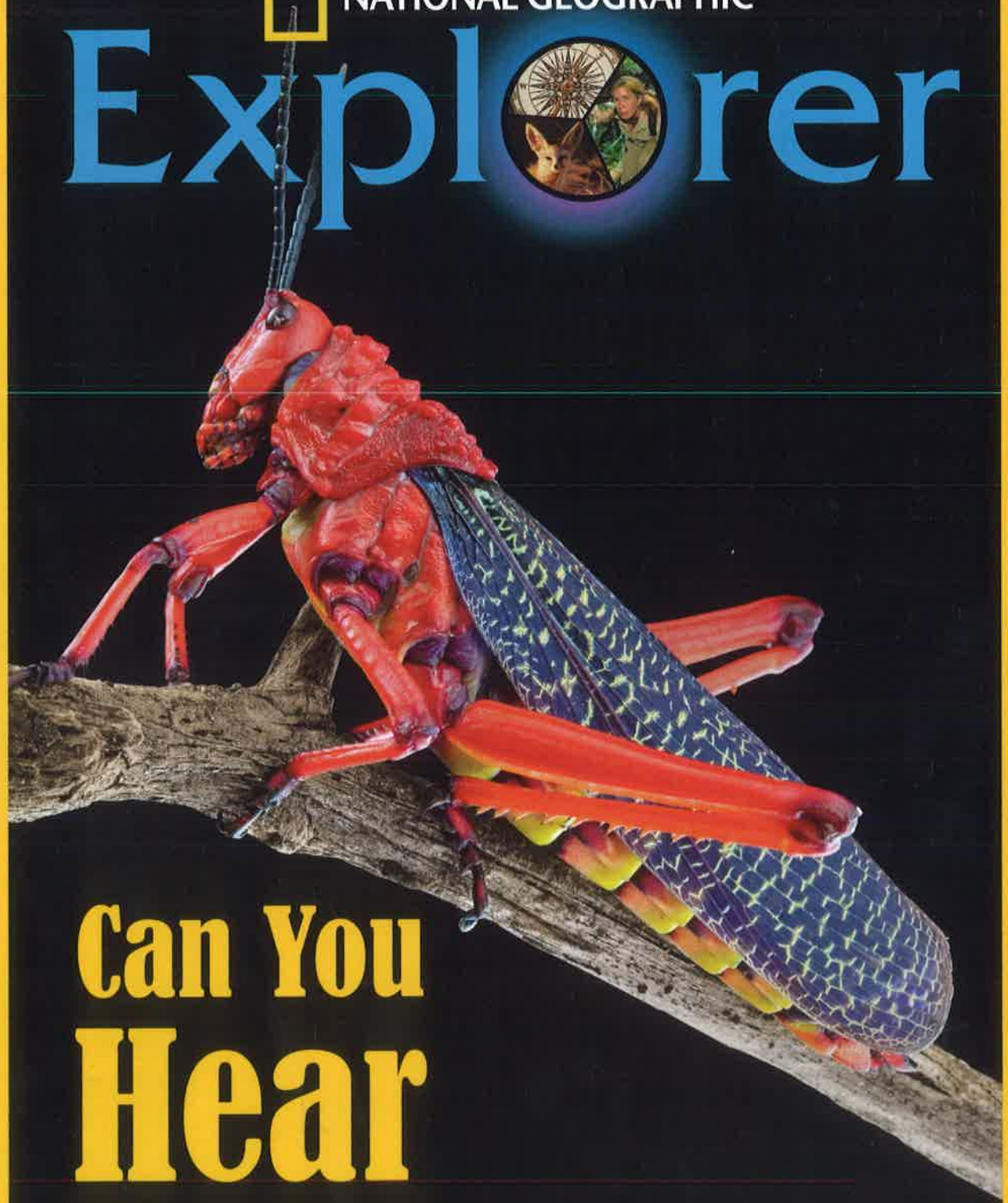
PIONEEER EDITION NGPIONEER.ORG NOVEMBER–DECEMBER 2011

NATIONAL GEOGRAPHIC

Explorer

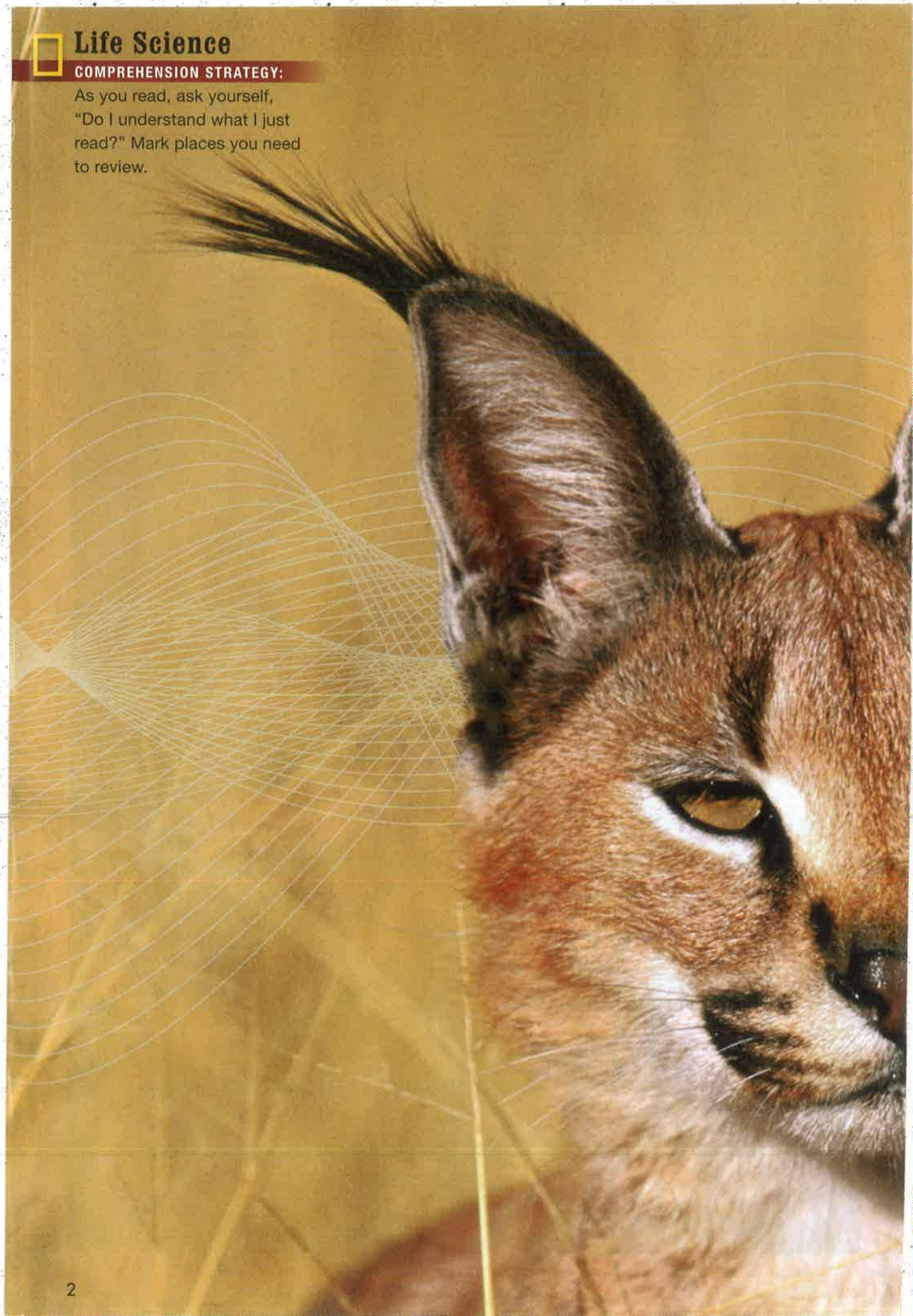


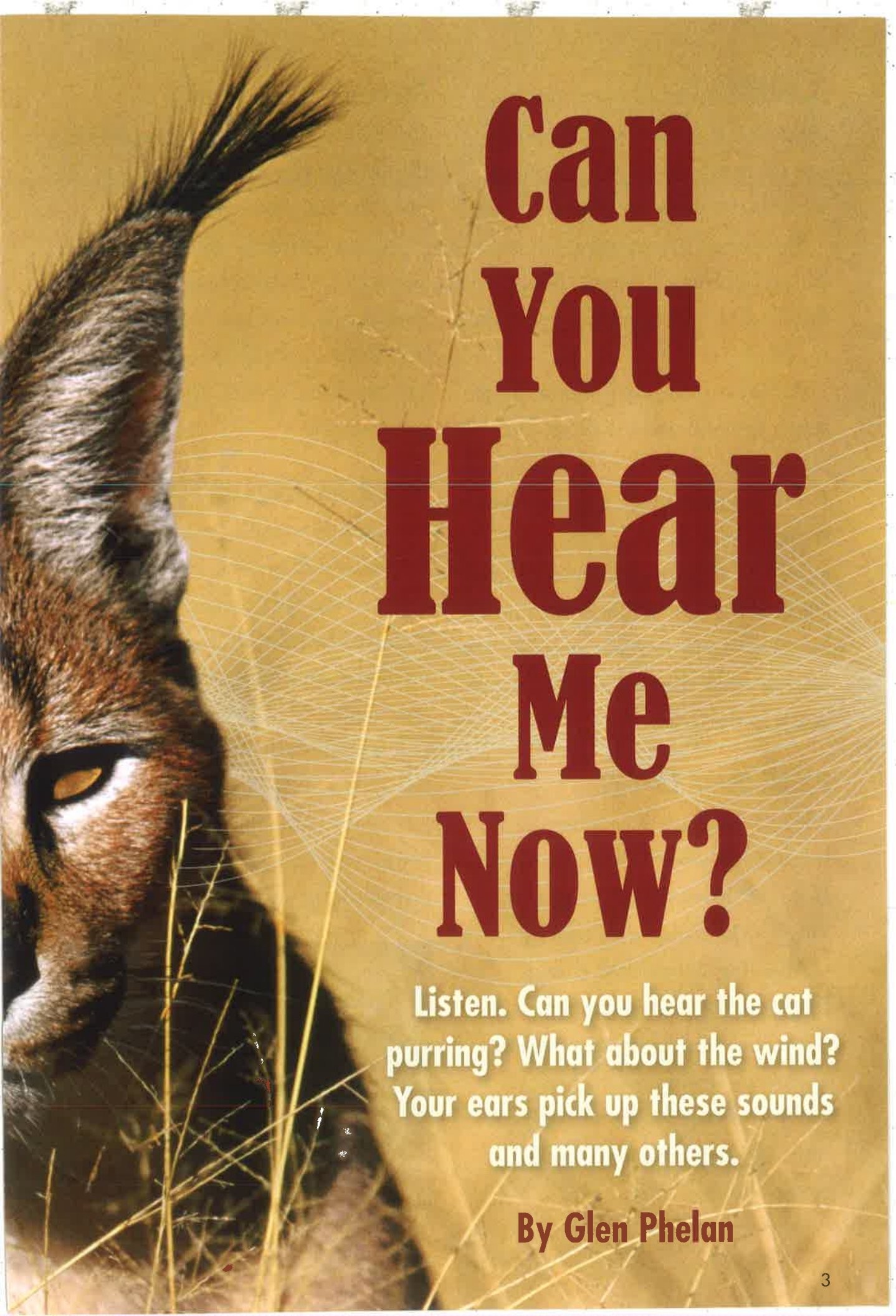
Can You Hear Me Now? 2

Life Science

COMPREHENSION STRATEGY:

As you read, ask yourself, "Do I understand what I just read?" Mark places you need to review.





Can You Hear Me Now?

Listen. Can you hear the cat purring? What about the wind? Your ears pick up these sounds and many others.

By Glen Phelan

A mouse looks out at the cornfield. It's night, but the mouse can see many seeds on the ground. It wants the seeds for dinner.

The mouse moves quietly. It must be careful. Danger is near. Foxes hunt. Snakes slither. A house cat creeps into the field.

For the mouse, the greatest danger is in a tree. An owl sits there. The owl is listening.

The mouse is quiet, but not silent. It makes sounds. It brushes against a dry leaf. *Whoosh*. Its tiny feet break a leaf. *Snap!* It scampers over more leaves. *Crackle, crackle, crackle*. The sounds reach the owl. The owl dives down to the field.

It's All About Energy

The owl knew the mouse was near. It heard the sounds the mouse made. How did the owl hear the sounds? The answer begins with **energy.**

All living things need energy. Energy makes things happen. The mouse uses energy to step on a leaf.

That energy breaks the leaf. The leaf **vibrates.** It moves air back and forth. These vibrations help pass energy along.

Energy You Can Hear

The vibrations make **sound waves** in the air. The waves carry sounds to the owl. The owl hears the mouse.

All sounds begin with vibrations. Test it out. Put your hand gently on your throat. Now say, "Ah-h-h." Can you feel your vocal cords vibrating? Say "Ah-h-h!" louder. The vibrations get stronger.

Sound: Its Highs and Lows

Sounds can be loud or soft. A mouse's squeak is soft. Sounds can also be high or low. That's called **pitch.** Pitch is caused by how fast a sound wave moves. A wave's speed is called its **frequency.**

A sound with a high frequency has a high pitch. A sound with a low frequency has a low pitch. Think of a bee's *bzzzz*. Its wings are vibrating fast, so the sound has a high pitch.

A bee's buzz comes from its vibrating wings.

After hearing a mouse looking for food, this owl captured it.

HOW WELL DO YOU HEAR?

Scientists can measure how high or low a sound is. They use a measurement called hertz (Hz). See how our hearing compares to the hearing of some other animals.

Elephant
16-12,000 Hz

Human
20-20,000 Hz

Dog
67-45,000 Hz

Dolphin
75-150,000 Hz

Getting an Earful

Not all ears are alike, but they all work alike. Their job is to catch sound waves.

Reach up and touch one of your ears. What you are feeling is the pinna. It's shaped like a funnel. The pinna's shape catches sound waves.

The pinna directs the waves into the ear canal. Let's ride the waves into your ears and see how it all works.

Catch the Waves

At the end of the ear canal is the eardrum. It's a thin piece of skin. It's stretched tight across the ear canal like a drum. The skin vibrates when sound waves hit the eardrum. Now things really get shaking!

The other side of the eardrum is connected to three small bones. They are the smallest bones in your body. These bones are often called the hammer, the anvil, and the stirrup.

The eardrum passes the energy of the sound wave from bone to bone to bone. The last bone, the stirrup, passes the energy to the cochlea.

The cochlea is in the inner ear. It's a coiled tube filled with liquid. Thousands of tiny hairs line the cochlea.

Inside the Inner Ear

The vibrations make waves in the liquid. The waves cause the hairs to move back and forth.

These hairs are connected to nerve cells. The nerve cells turn the vibrations into messages. They send the messages to the brain. The brain turns the messages into sounds that you can hear.

It seems like it might take a long time for sound to reach your brain. Yet sound travels very quickly. Sound can move 343 meters (1,125 feet) per second through air.

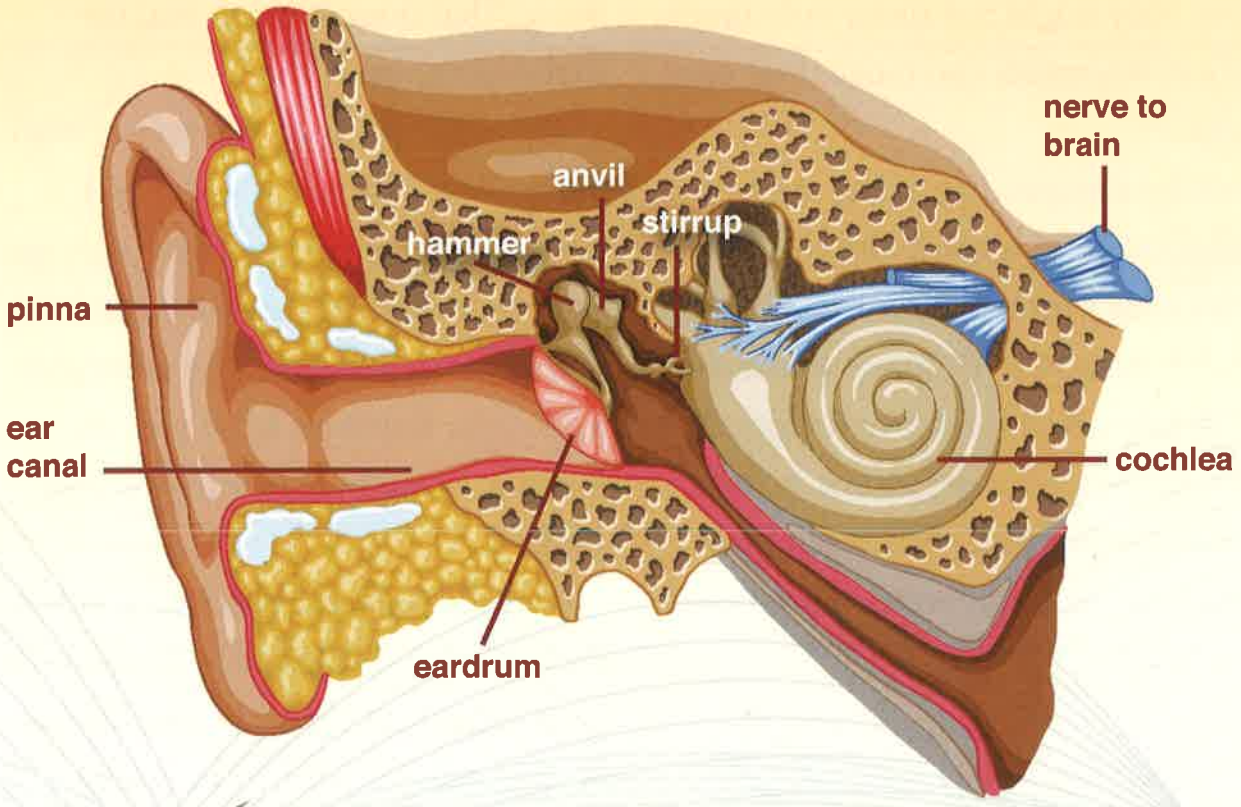
ALL EARS

All ears do the same job. Yet they come in many different shapes and sizes. Take a look at these odd ears.

Gecko

If you're looking for a gecko's ears, check out the hole in its head. In some geckos, you can see right through the hole to the other side.

PARTS OF AN EAR



Caracal

This African wild cat has 20 muscles in each ear. The muscles control which way its ears point. Fur inside its ears may help direct sound waves.

Sea Lion

Sea lions have tiny ear flaps. Their sense of hearing is important to their survival. Sea lions generally hear better underwater than out of the water.

Ears That Wiggle

Can you wiggle your ears? If you can, they might not move very much. Many mammals can move their ears a lot.

Take a fennec fox. It has many muscles in each ear. It can turn its ears in any direction. For the fox, this isn't a cute trick. It's a way to survive.

It helps alert the fox to danger. The fox can listen for predators. It also helps the fox find prey. It can hear the movements of insects and lizards.

This grasshopper's "ears" are on its abdomen.

Hidden Ears

A snake doesn't have outer ears to move. That doesn't mean that the snake can't hear.

The snake picks up vibrations from the ground. The vibrations travel through the snake's jaw. Then they go to its inner ear. So the snake can hear you before it sees you. The vibrations from your footsteps tell it you are coming. It can hide before you even see it.

Owls do not have outer ears, either. Each ear is a small hole near the owl's eyes. Owls hear the same sounds we do, but more clearly. That's partly because of the shape of the owl's face. The sides of its face look like scoops. The scoops direct sound into each ear.

Ears in Odd Places

Don't look for outer ears on a cricket or a grasshopper, either. They have special ear parts that act like eardrums. These parts are on the outside of their bodies. A cricket's are on its legs. A grasshopper's are on its abdomen.

No matter what they look like or where they are, ears collect sound. Sound tells us what is happening in our world.

A snake's inner ears help it pick up sound waves.

Large ears help this fennec fox listen for predators in the desert.

WORDWISE

energy: the ability to cause a change or make something happen

frequency: the number of sound waves per second

pitch: the highness or lowness of a sound

sound wave: vibrations that carry sound

vibrate: to quickly move back and forth

Social Studies

COMPREHENSION STRATEGY:
As you read, look for ways to compare and contrast information.

Race to the

Join two explorers as

South Pole

they race to the bottom of the world.

By Michael E. Ruane

The pony whinnied as it walked through the deep snow. Robert F. Scott watched as it struggled to stay on its feet. It was winter in 1911. Scott was trying to reach the **South Pole.** He had already tried once. On that **expedition,** Scott and his team had come close. They didn't make it, though. This time, he was using ponies and fewer sled dogs. Maybe that would help.

Two Men, One Goal

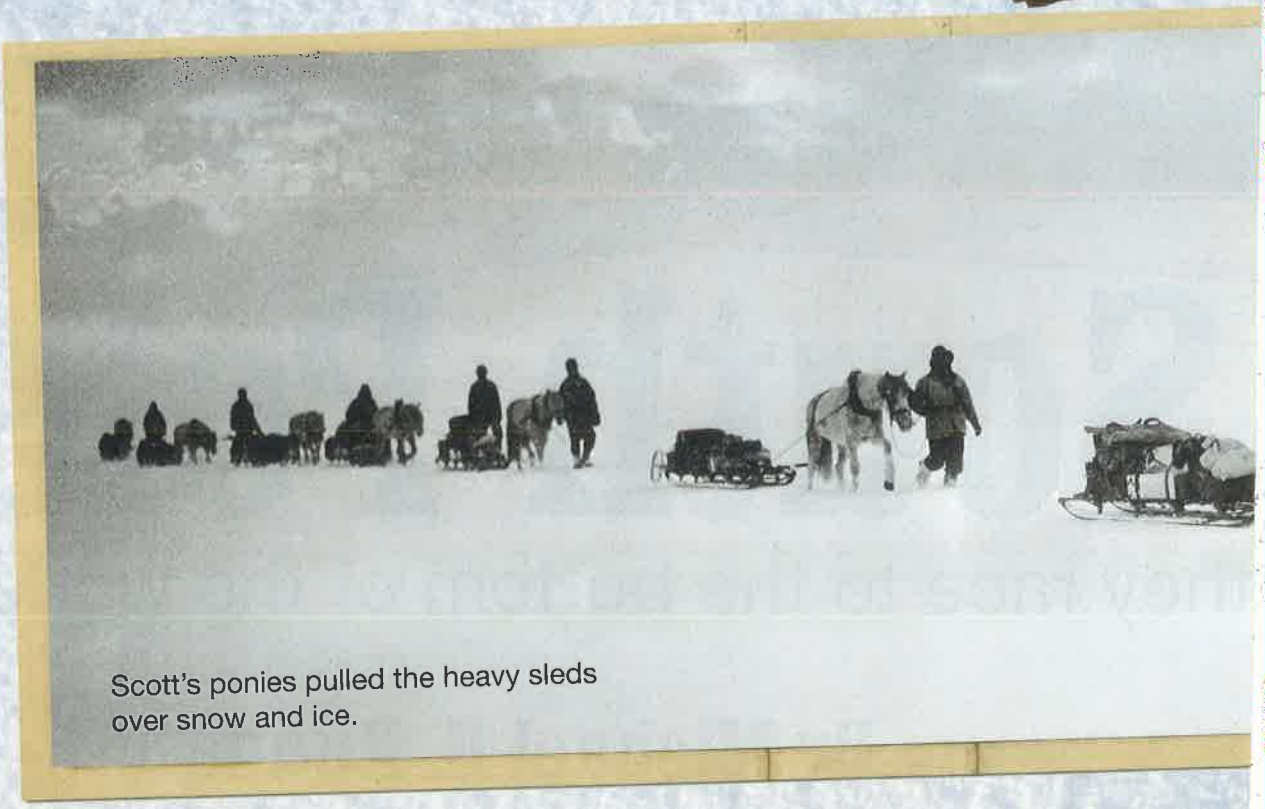
Roald Amundsen had the same goal as Scott. He was leading another expedition. Both men wanted to be the first person to reach the South Pole. So it would be a race to the Pole!

Each man's team would travel more than 2,900 kilometers (1,800 miles). One man would make it. The other would lose his life.

Getting Ready

The teams planned their trip. Scott would take the same path he had used before. Amundsen would go through an unexplored area.

Each team set up supply stations along the paths they would take. They left food and fuel for heat at each station. That way they wouldn't have to carry all their supplies.



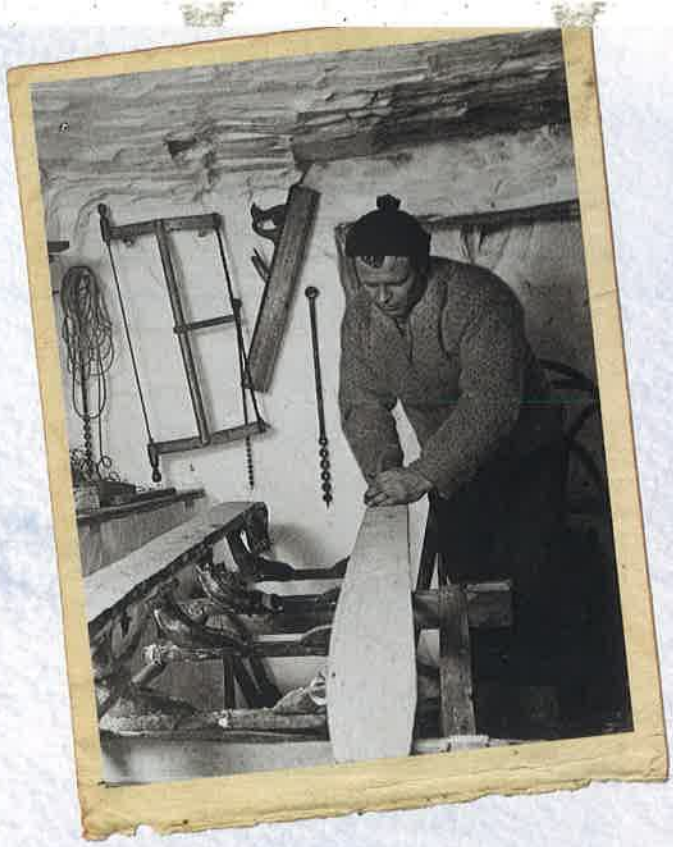
Scott's ponies pulled the heavy sleds over snow and ice.

Danger on the Ice

After setting up a supply station, disaster struck. Some of Scott's sled dogs fell into a crack in the ice.

Scott's team was able to pull most of the dogs out of the crack. But they couldn't reach two of them.

Scott ordered the team to drop a rope into the crack. He grabbed it and climbed down. He picked up the frightened dogs and rescued them.



A member of Amundsen's team works on a sled to make it slide easily on ice and snow.

Scott's team used these skis and sled.

Chris was one of the few sled dogs that Scott used on his trip to the South Pole.

The Race Begins

Amundsen: Spring came. Amundsen felt ready. He and his team loaded the sleds. The dogs pulled the sleds. The men skied beside them.

One day, a howling blizzard roared across the ice. The team stayed calm. They set up their tents. They cooked a meal and fed the dogs.

Scott: Scott left his camp two weeks later. He hoped the ponies could survive in the cold.

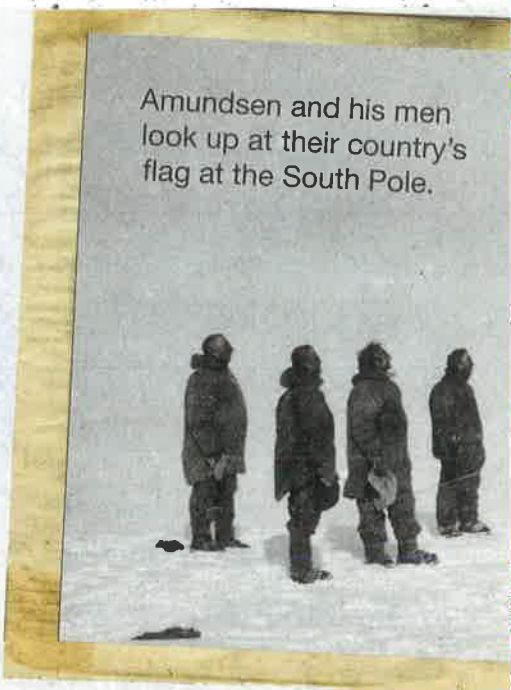
Before long, Scott and his team were feeling the cold. Their wool clothes did not keep them warm. When the wool got wet, it took a long time to dry.

Amundsen: Weeks passed. Both the dogs and the men were hungry.

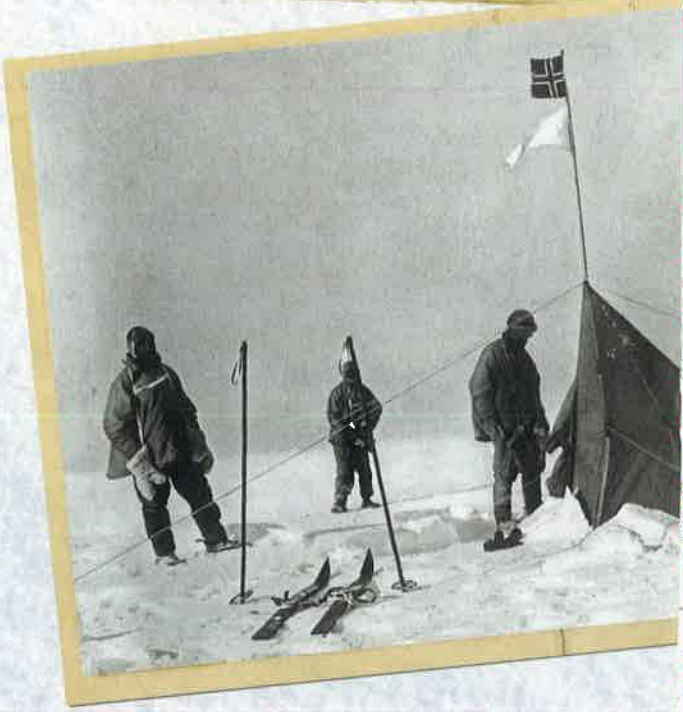
Now a large mountain of ice stood in their path. The dogs struggled to pull the sleds up the steep ice. They kept going.

Scott: Meanwhile, Scott's team got stuck in a blizzard. They waited inside their tent.

The storm lasted four days. The ponies did not survive it. Scott's team had to pull the sleds.

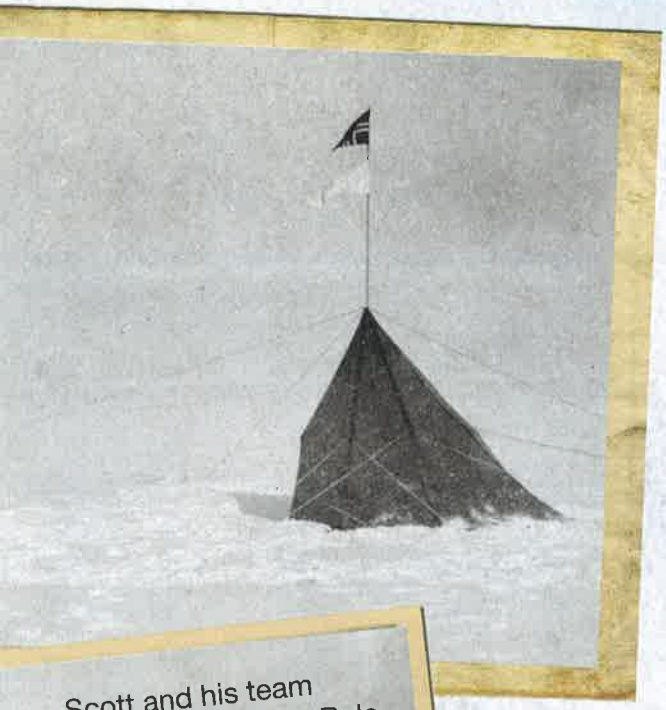


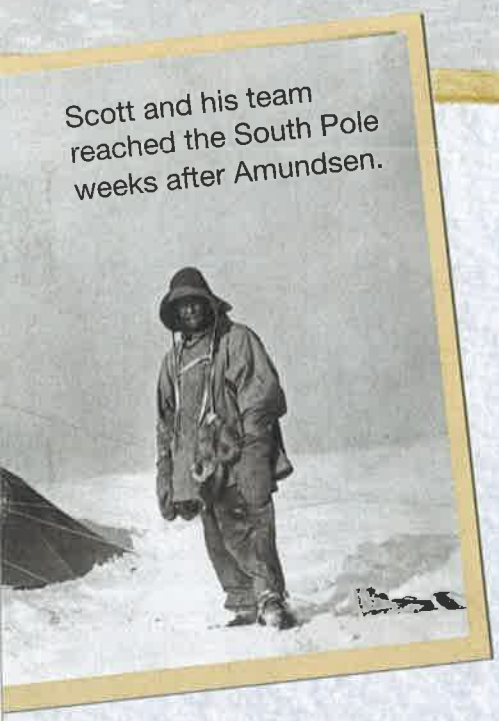
Amundsen and his men look up at their country's flag at the South Pole.



Amundsen: Amundsen's men had frostbite on their hands and feet. The dogs were very hungry. They even tried to eat a pair of boots.

Then one day, Amundsen checked his **navigational instruments.** He was standing at the South Pole. His team had won!





Scott and his team reached the South Pole weeks after Amundsen.

Recovery Mission

Months later, a rescue party found Scott's tent. He and his team had died of hunger and cold.

Today, Scott and Amundsen are still remembered. Their courage inspires others. Brave explorers willingly go on dangerous expeditions. They are making amazing discoveries.

Wordwise

expedition: a long journey by a group of people to explore an area

navigational instruments: tools to help people find their way

South Pole: the southernmost point of Earth's axis

Scott: Scott and his men were sick and weak. Then one morning, Scott saw a flag left behind by Amundsen. He knew he had lost the race.

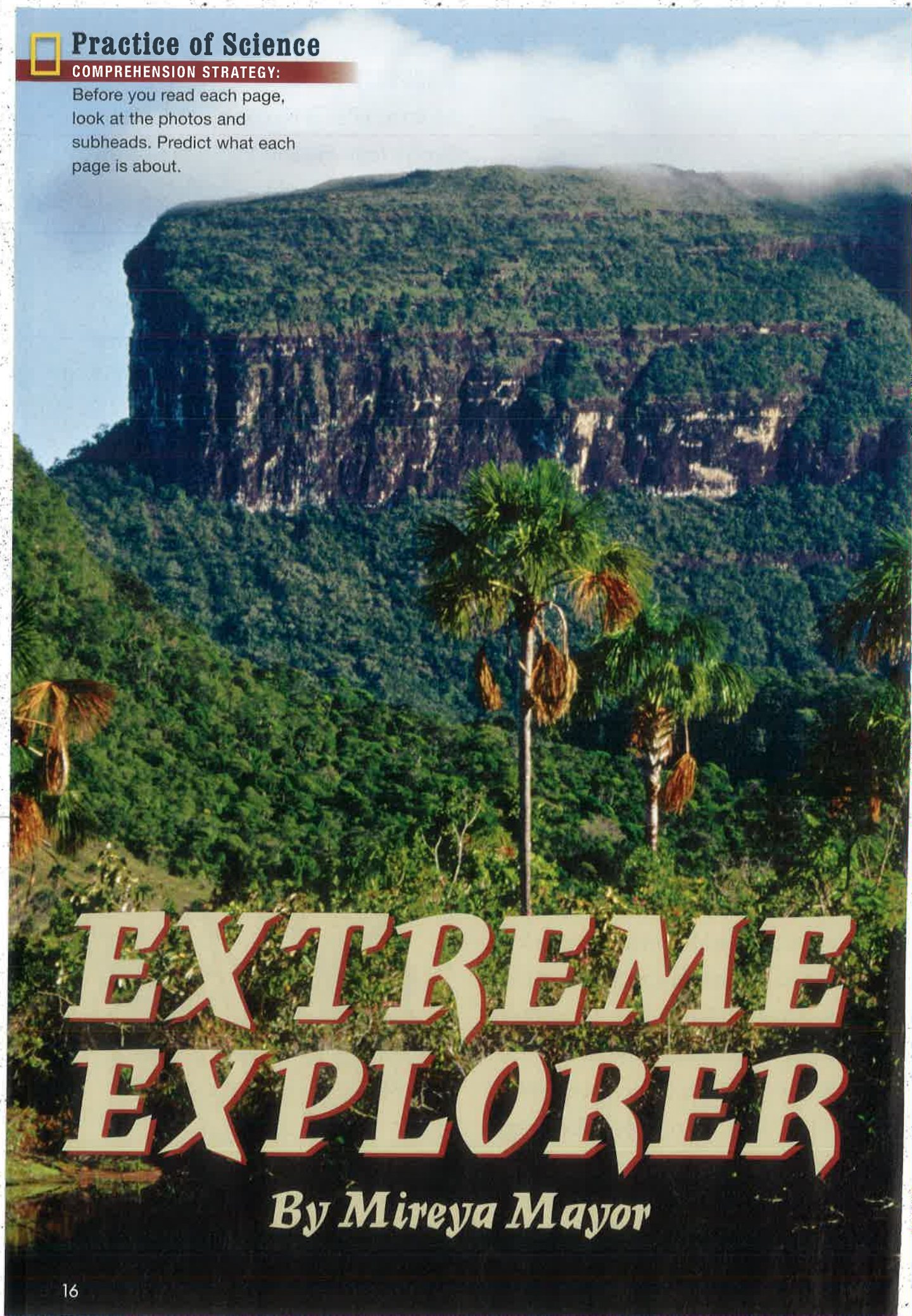
Scott's team had reached the Pole 34 days after Amundsen. They began the trip back. Then another blizzard struck. The team could not go on.

Scott's men wore spikes to help them walk on the ice.

Practice of Science

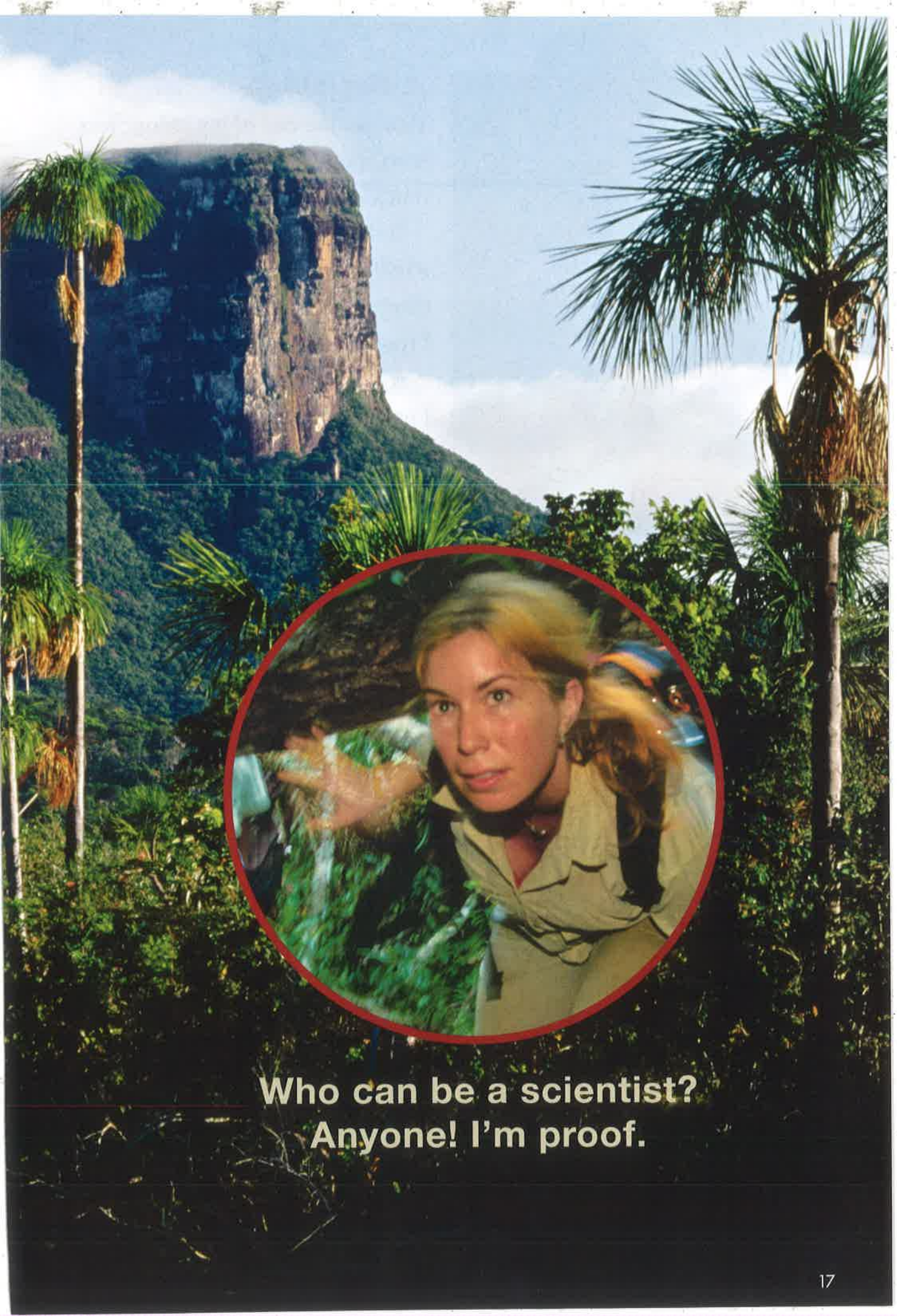
COMPREHENSION STRATEGY:

Before you read each page, look at the photos and subheads. Predict what each page is about.

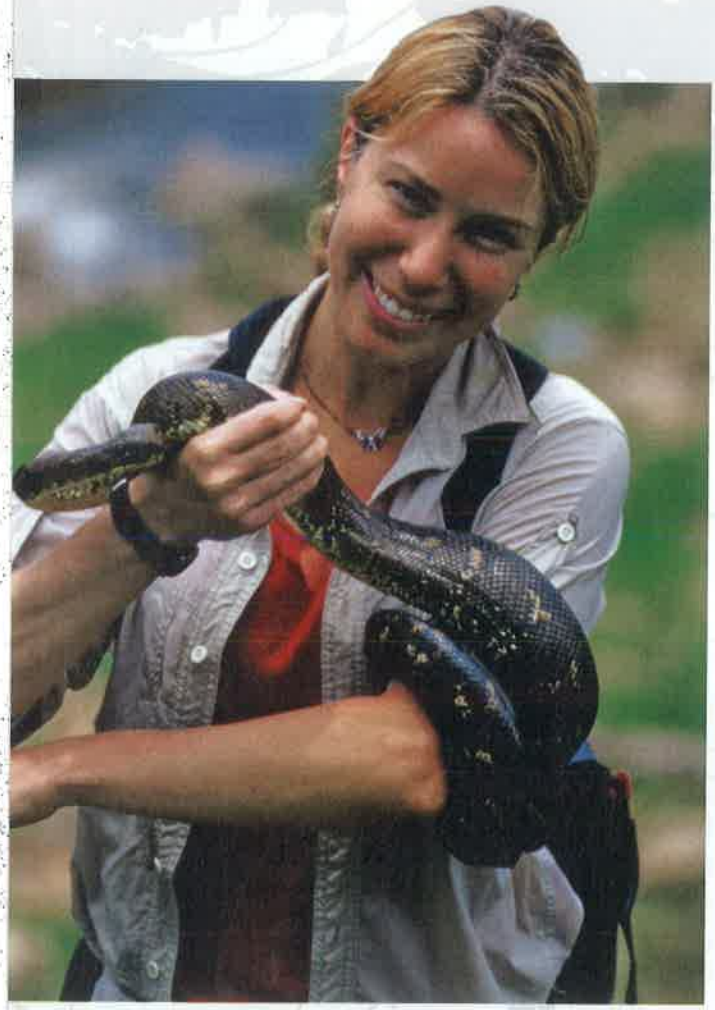


EXTREME EXPLORER

By Mireya Mayor



Who can be a scientist?
Anyone! I'm proof.



A Beginning

That was the end of my indoor zoo. It was not the end of my curiosity, though. That was just the beginning.

Today, I'm a scientist. I study wildlife. I hike through jungles and climb tall cliffs. I swim with sharks. I travel all over the world.

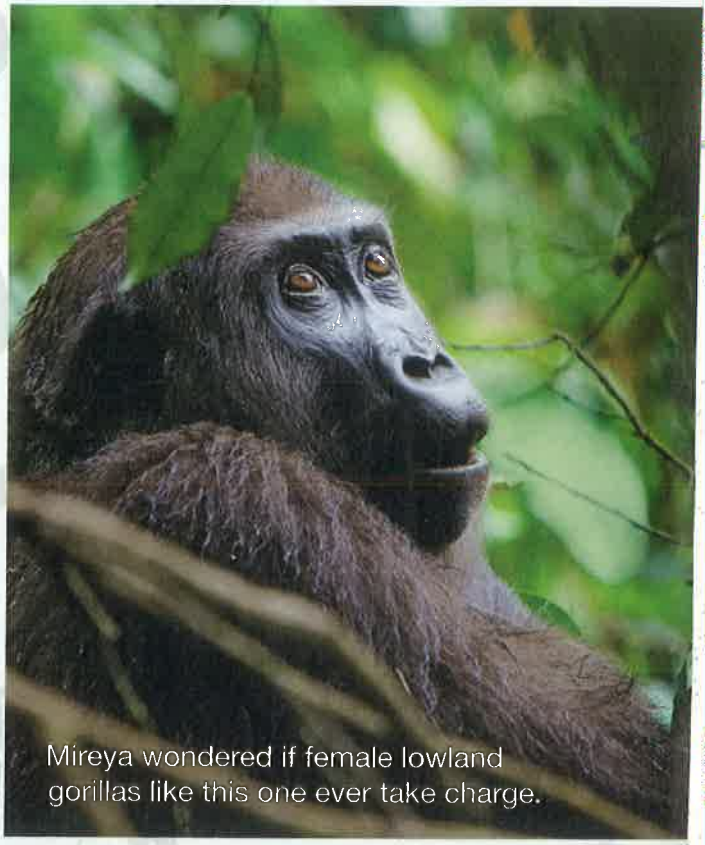
A few years ago, I was in Africa. I went there to study gorillas. Male gorillas are called silverbacks. They protect their families from danger.

Silverbacks can weigh up to 180 kilograms (400 pounds). When they run, the ground shakes. It's very scary. The females are not as scary.

"Mireya!" my mom yelled. Uh-oh. Mom had found my secret zoo. I was 9 years old and always curious about wildlife. I'd climb trees to hunt for lizards and bugs. I even collected a stray turtle.

I kept the turtle in my plastic wading pool. Sometimes it swam in our bathtub. Then one day, it bit my grandmother.

Now my zoo had escaped. Spiders, worms, and snails were crawling on the floor. Mom was not happy.



Mireya wondered if female lowland gorillas like this one ever take charge.