

PIONEER EDITION

NGPIONEER.ORG

NOVEMBER-DECEMBER 2010

# NATIONAL GEOGRAPHIC Explorer!



## Out of Sight

16

Great Migrations 2

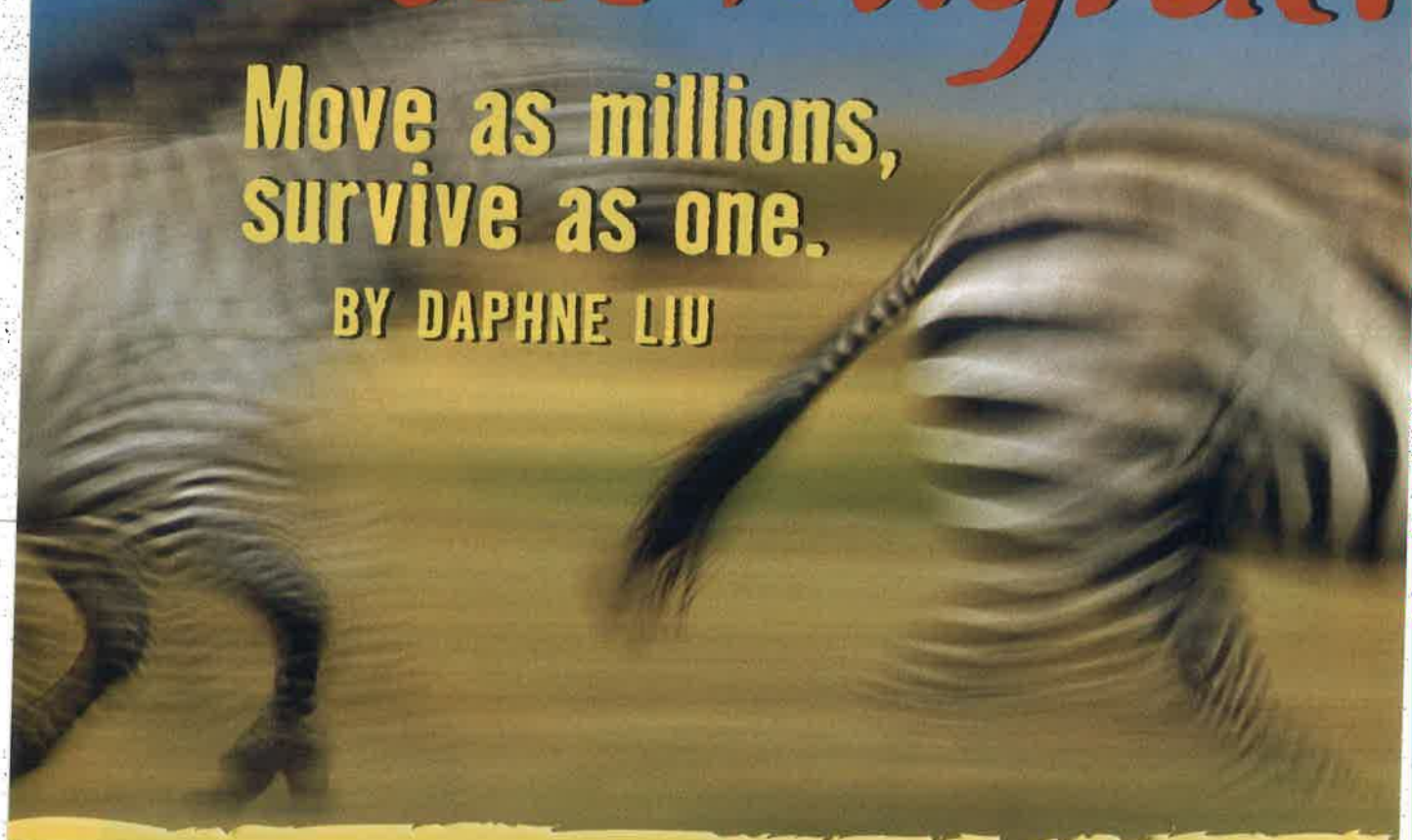
Far-Out Foods 10



# Great Migration

Move as millions,  
survive as one.

BY DAPHNE LIU

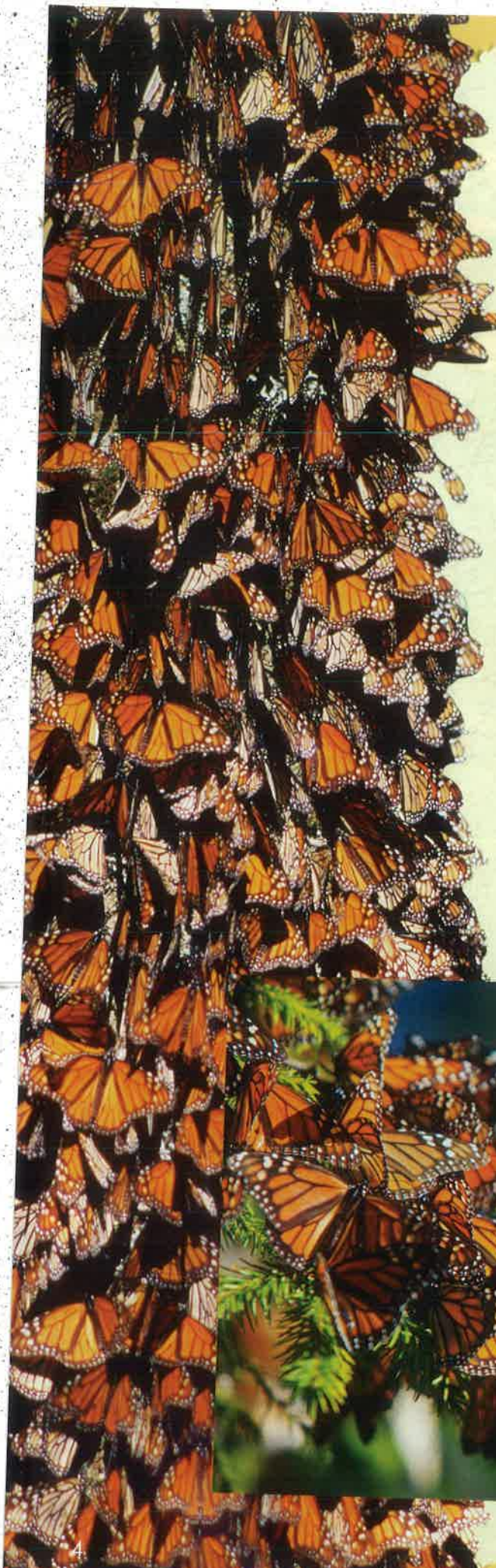




**Comprehension Strategy:**  
Think about animals that migrate. Ask yourself how and why they migrate.

ONS





**H**ooves pound. Wings beat. Fins paddle. Every year, millions of animals **migrate** across Earth. Why do they go? Guided by **instinct**, they move to survive. They search for warmer weather, food, or safe places to raise their young. Join some of nature's travelers. Follow their journeys across air, land, and sea.

### **Ruling the Sky**

Orange and black wings fill the sky. It's fall in North America. Monarch butterflies are on the move. They are heading for California and Mexico. Some fly as far as 4,828 kilometers (3,000 miles). The trip takes two months. It takes a special kind of insect to make this long journey.

monarch butterflies





rufous hummingbird

## Born to Fly

Most monarchs live four to five weeks. Not all, though. A special group of monarchs can live up to eight months. They grow slowly. They store fat in their bodies. These monarchs are born to migrate.

Cold weather kills monarchs. It kills the plants they eat, too. When winter comes, it's time for the special monarchs to migrate. They can travel 130 kilometers (80 miles) in only one day.

Finally, the butterflies reach their winter home. Even here, they must crowd together for warmth. They live on their stored fat. They spend much of the time sleeping.

In spring, they migrate back. Along the way, they lay eggs. Then they die. The newborn monarchs fly on.

## Fearless Flyers

It's late in the summer in Alaska. The rufous hummingbirds get ready for winter. The birds begin to eat and eat. Soon they're fat and full of fuel. They will need that extra energy.

These tiny birds fly from Alaska to Mexico. That's more than 6,000 kilometers (3,700 miles). Like monarchs, these birds can't live in the cold. Mexico is warmer.

Each bird makes this trip alone. It doesn't fly in a flock like many birds. This tiny bird flies over mountains and deserts. It searches for food. It dodges predators.

Finally, the bird reaches Mexico. It joins the other hummingbirds. Now it is safe and warmer. In spring, the birds return to Alaska. There, they lay eggs and raise their young.

## March to the Sea

It is October and raining on Christmas Island. Fifty million red crabs are on the move. They are heading from the rain forest to the Indian Ocean. The trip is about five kilometers (three miles), but it is filled with danger.

Yellow crazy ants attack the crabs. The ants shoot acid into the crabs' eyes. The crabs go blind and die. The survivors march on. They go through busy towns. Traffic stops for them. Even so, moving wheels crush thousands. The rest keep going.

Finally, the crabs reach the water's edge. Each female crab lays about 100,000 eggs. Then they start their return trip.

In the water, the eggs hatch right away. The crab **larvae** come out. Whale sharks gobble up some of them. Other fish eat them, too. Waves smash them. Some years though, millions survive.

Soon, the larvae change into crabs. Their **metamorphosis** is complete. Now they march back to the rain forest like their parents before them.



Christmas  
Island crabs





emperor penguins

## Across the Ice

Most birds migrate *away* from the cold. Not emperor penguins. They go far into Antarctica. The temperatures fall below zero. There's no food and little shelter. There are no predators, either.

In this remote spot, the mother penguin lays one egg. She places it on top of its father's feet. The father's body keeps the egg warm. He keeps it off the ice so it doesn't freeze.

The mother walks back to the sea to feed. She might be gone for weeks. The father stays with the egg. It hatches while the mother is away. Finally, she returns and the father leaves to feed.

Summer arrives. The babies are growing strong. Soon they will make their first journey to the sea.

Emperors aren't the only penguins that migrate. So do rockhoppers. In summer, these birds nest on cliffs. During winter, they head for warmer seas. They swim, eat, and snooze on the waves.



rockhopper penguin

## Wandering Whales

Each year, humpback whales swim between cold and warm waters. They travel 9,600 kilometers (6,000 miles). No other mammal migrates as far.

These great swimmers spend summers in cool, northern waters. These waters are rich in krill and small fish. Whales eat them to build up their body fat, or blubber.

They scoop seawater filled with krill and fish into their mouths. The water pours out. The whales trap the food in their mouths. Think about how much a small car weighs. That is how much food a whale eats a day!

There are problems in the northern waters, though. It is not a good place for whales to have their babies. The water is too cold for newborn calves. Many predators live here, too.

So in the fall, humpbacks start swimming south. That's where they give birth. They swim just below the water's surface. They travel up to nine kilometers (six miles) an hour.

Southern waters are safer for the calves. Here, they grow strong. The adults can't get enough food in these waters, though. So in spring, each whale family returns north.



humpback whale





zooplankton

## Keep Moving

Millions more animals migrate each year. It's hard and dangerous. Is the risk worth it? Yes! They move as millions to survive as one.

Success means life for an animal. It means life for its babies. It can mean even more. Migration may mean survival for a whole species. That's an incredible journey!

Find out more about "Great Migrations" at [natgeotv.com/migrations](http://natgeotv.com/migrations).

## Tiny Travelers

Zooplankton are one of Earth's tiniest travelers. Most are smaller than a speck of dust. They are at the bottom of the ocean food chain. Every ocean creature either eats them, or eats something that eats them.

These animals migrate every day. They don't migrate across the ocean like whales, though. They move up and down like an elevator.

Each night, zooplankton swim to the surface. There, they feed. By morning, larger animals are hunting for them. To escape these predators, the zooplankton dive down into deep, dark water. Some go up and down 457 meters (1,500 feet) a day.

## Wordwise

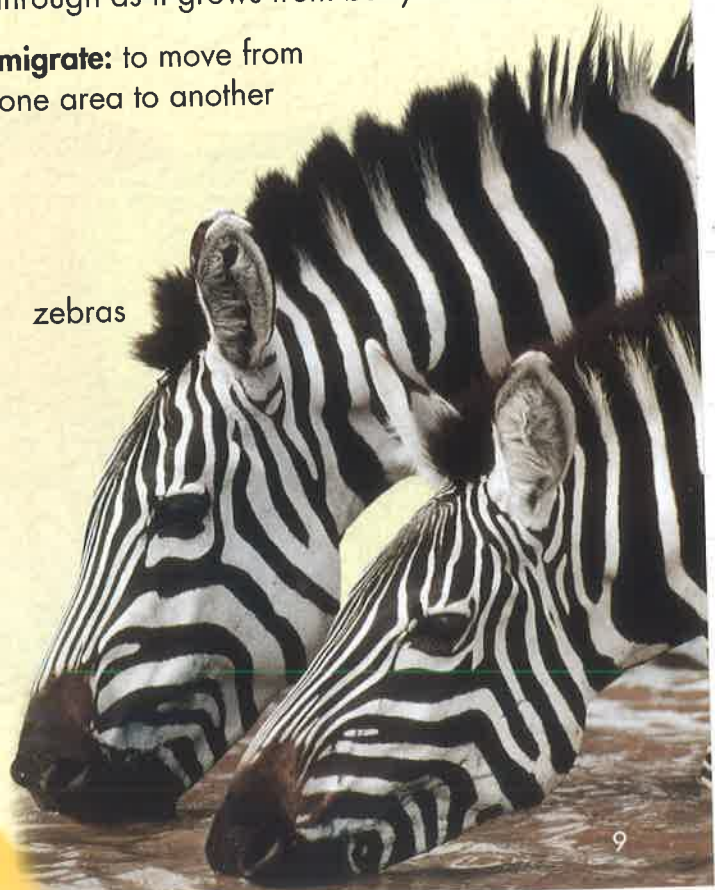
**instinct:** behavior that is natural from birth

**larvae:** young form of some animals

**metamorphosis:** change an animal goes through as it grows from baby to adult

**migrate:** to move from one area to another

zebras





**Comprehension Strategy:** As you read, think about the foods you eat and why.



# Far-O

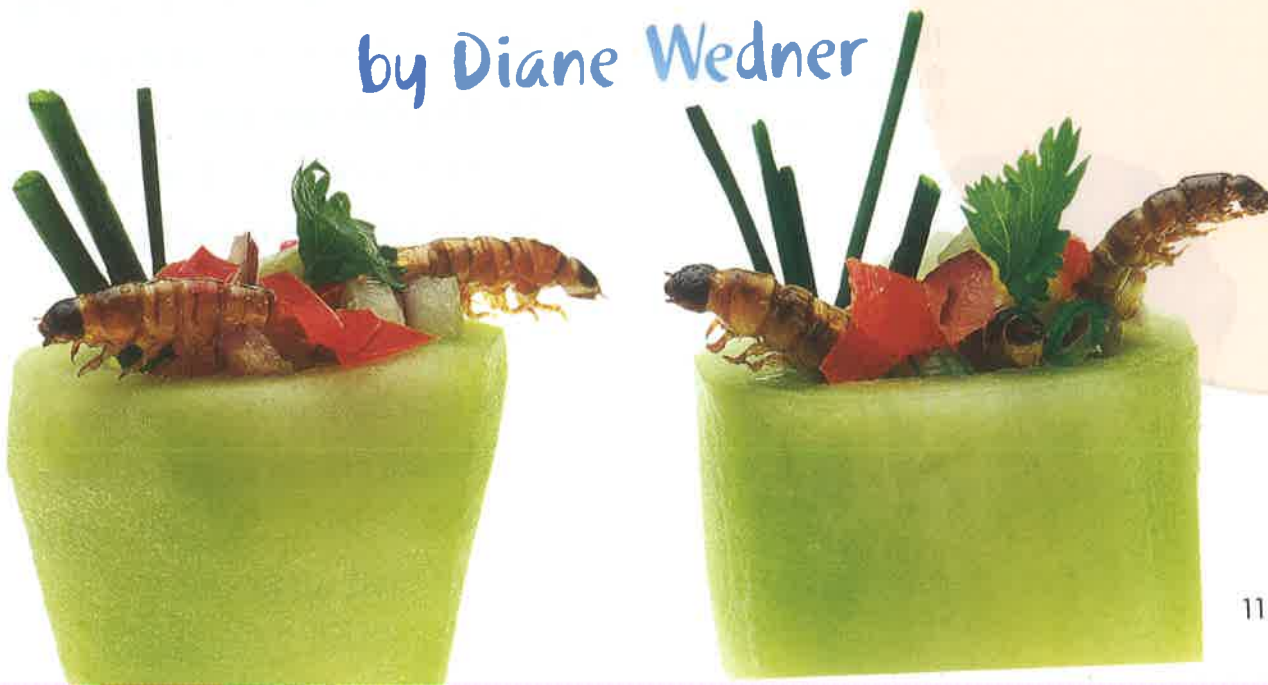




# ut Foods

Would you eat anything on this page? In many places, these far-out foods are on the menu.

by Diane Wedner



**Wade Davis** will eat just about anything. Being brave like that comes in handy for this National Geographic explorer. Once he went to Colombia. He hiked into the rain forest. There, the local people offered him a treat. It was a wriggling termite.

Davis grabbed the small bug. He popped it in his mouth and chewed. Gulp! Davis swallowed the crunchy critter. It tasted like lemon and bacon fat. "It was pretty tasty," he says.

Davis is an **anthropologist**. He studies people and **cultures**. Sharing food is important to his job. It helps him show respect for the people he meets. It also helps him learn their customs. It teaches him how they live.



The abdomen of this honey ant is full of a sweet juice.



## Sweet Snack

You may think eating insects is gross. Yet people all over the world eat them. They can taste good. Aborigine people in Australia like honey ants. These ants eat other insects and nectar. They make a sweet juice.

A honey ant stores the juice in its body. The back part swells like a grape. The ant colony eats this juice. So do the Aborigine. They bite off the "honey pot" and sip the juice.



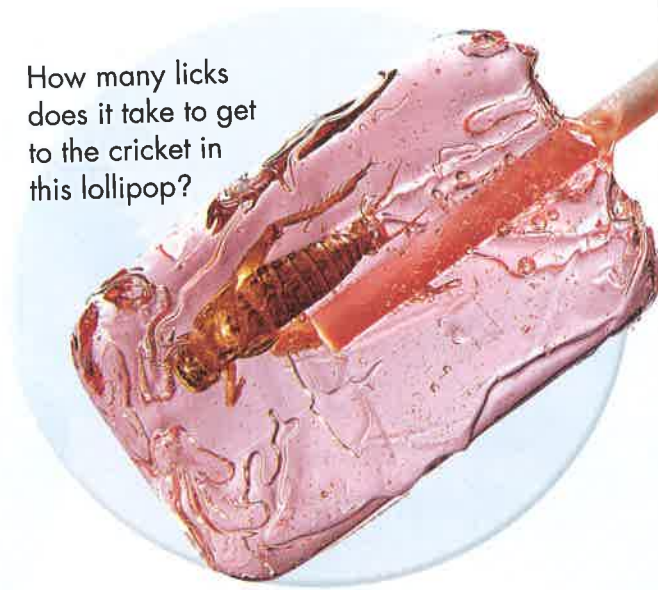
In China, shoppers can buy bug snacks like these brown silkworm pupa on a stick.

## Good for You

Insects are more than sweet treats. They are **nutritious**. Some are full of protein. Protein builds muscles. It also makes new blood cells.

Insects are good for you in other ways, too. Grasshoppers are low in fat. Water bugs are high in iron. Iron is good for your blood. The termites that Davis ate had magnesium. It helps your muscles, nerves, and bones work.

How many licks does it take to get to the cricket in this lollipop?



## Bug Bounty

Here's another good thing about bugs. There are millions of them. They live just about everywhere. No wonder insects are part of many **traditional diets**.

You can buy grasshoppers by the bag in Mexico. Just roast them and wrap them in a tortilla. At the movies in South America, you might snack on roasted ants instead of popcorn. In Thailand, you'll find bins of bugs. Look for deep-fried silkworms and water bugs. A handful makes a great snack.

Even if you haven't been to these places, you might have eaten bugs. Do you eat chocolate and peanut butter? Bug bits end up in these and other foods. You probably eat more bugs than you think. Some say we eat half a kilogram (a pound) a year.



Some people think the prickly durian fruit smells bad. Yet it tastes good.

## Funky Fruit

Not so sure about a bug diet? Well, fruit is good, right? Give durian fruit a smell. That might change your mind. Some people say durian stinks.

It grows as big as your head and is covered in spikes. Yet many people like durian. The roasted seeds taste like nuts. Some say the fruit tastes like vanilla. Others say it tastes like a mix of strawberry and garlic.

Durian grows in Southeast Asia. There is a lot of it. It's also healthy. It's high in fiber. Fiber helps you digest food. Durian has carbohydrates, too. They give you energy.



Cactus is another prickly plant on the menu. It's popular in places like Mexico.

## Poisonous Plant

If you think durian isn't right for you, try manioc. This bitter root grows in the Americas, Asia, and Africa. It's as filling as spaghetti. Manioc is also poisonous.

In the Amazon, the women of the Cubeo people turn this poisonous plant into a safe supper.

First they grate the giant roots. Then they wash the pulp many times. They strain it. They squeeze it. The poisonous juice runs out. The pulp is then used to make bread and cakes. You may have eaten manioc before, without the poison. It's in pasta.



In Japan, chefs turn a deadly fish into a pretty dish.

## Taste Test

Manioc root isn't the only deadly dish. In Japan, people eat fugu. Fugu is made from pufferfish. Puffer poison is bad news. A pinch can kill 30 adults! Japanese cooks remove the poisons. Even a tiny bit can make your tongue tingle.

No matter where you are, trying new foods can be an adventure. Feeling a little queasy? Wade Davis says, "Don't think about it. Just try it. If another human being can eat something, you can, too."

What is the most interesting food you've ever eaten?



## Wordwise

**anthropologist:** scientist who studies human beings

**culture:** way of life for a group of people

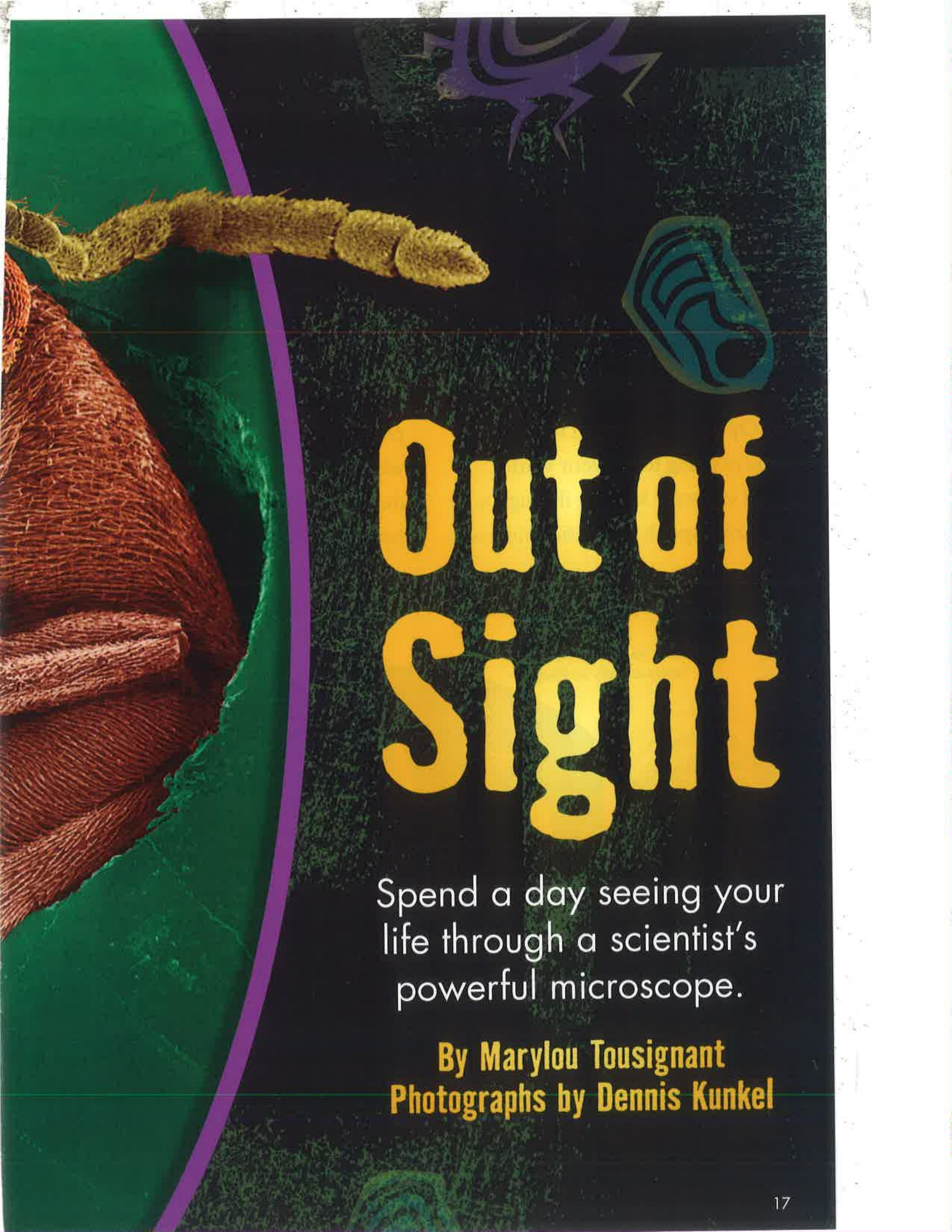
**nutritious:** healthy for you

**traditional diet:** way of eating that is passed down from one generation to the next

**Comprehension Strategy:** As you read this story, think about how you usually see the objects in the story. Then compare them to how they look under a microscope.







# Out of Sight

Spend a day seeing your life through a scientist's powerful microscope.

**By Marylou Tousignant  
Photographs by Dennis Kunkel**