NATGEO.ORG/EXPLORERMAG | VOL. 18 NO. 1

NATIONAL GEOGRAPHIC

# Explorer

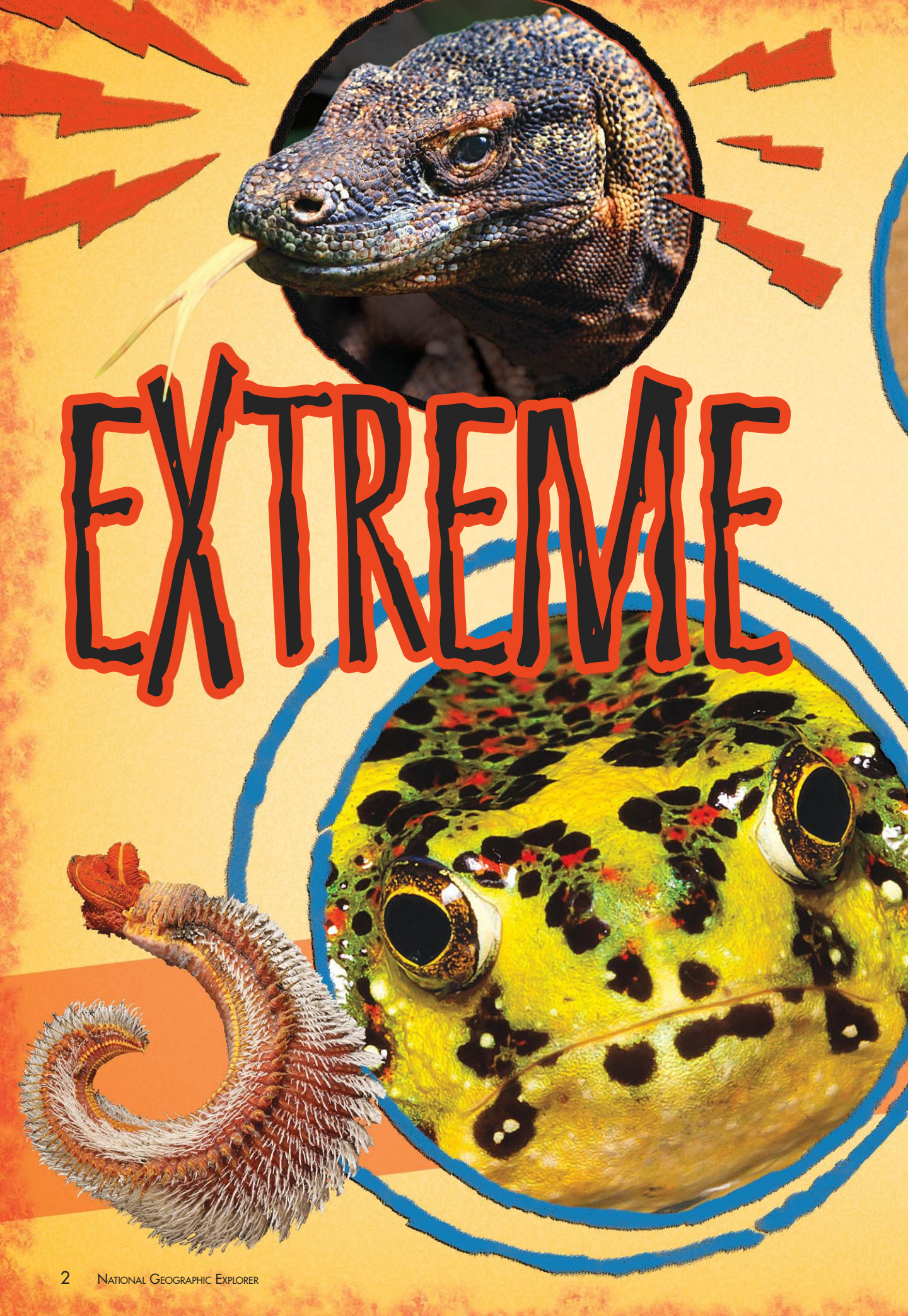
PATHFINDER



## Extreme Animals 2

Amazon Adventure 8

Wedges 16

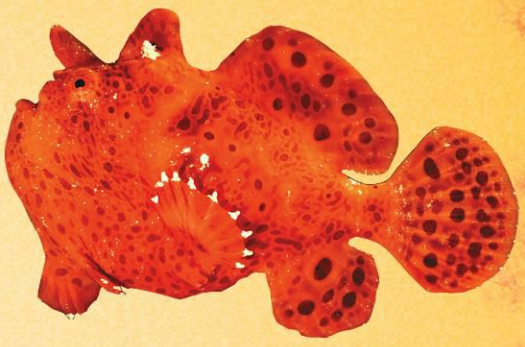

EXTREME



## Wildlife

**ADAPTATIONS**

As you read, think about how these animals use their internal and external structures to survive.



# ANIMALS

**Super-sticky skin, killer drool, slimy coats, and blood-squirting eyes. Some animals go to extremes to survive.**

By Lynn Brunelle



## Stickiest Situation

Rain pours down after a long, hot, dry season on the Australian grasslands. It soaks the ground. Soon, the mud starts to move. Insects come out and start looking for food. A ping-pong-ball-shaped frog called a crucifix frog wakes from a long sleep. She digs her way to the surface. The cross-shaped pattern on her body stands out. The insects spot her and attack.

Luckily, the crucifix frog has a special **adaptation.** She releases a sticky goo from her skin. The insects stick to the goo. She will soon shed, or slough off, her skin. Then she'll gobble up the old skin—glue, insects, and all.



These tiny crucifix frogs have skin so sticky, flies get stuck to it.

## Deadliest Drool

A yellow ribbon flicks in the air. It is a forked tongue attached to the drooling mouth of a 3-meter- (10-foot-) long lizard. It's a Komodo dragon on the hunt in a lush Indonesian forest.

Komodos have developed extreme adaptations for hunting. A Komodo dragon's tongue helps it taste the air to find **prey.** Its strong, jagged teeth can tear through large animals, like deer and water buffalo. But it's the drool, oozing over its tongue and teeth, that is its secret weapon.

Komodo dragon mouths are teeming with deadly bacteria. Rotten meat trapped between the teeth of the lizard feed more than 50 different kinds of bacteria. At least seven are deadly to most animals!

Komodos also have venom in their saliva. It prevents blood from **clotting,** which means bite wounds won't heal. So, a single Komodo bite delivers a poisonous **mix of bacteria and venom. After biting its prey, the dragon follows it and waits for it to die. Then dinner is served.**

A Komodo dragon's drool is full of bacteria that can easily kill.

## Speediest Sucker

A "worm" wiggles over a coral reef. A passing fish swims up to swallow it. Faster than the blink of an eye, the fish is sucked into the mouth of a frogfish.




Frogfish have three approaches to hunting. First, they are masters of disguise. Some look like rocks or sponges. Others look like seaweed. They blend in, unseen by passing fish.

Second, frogfish have built-in fishing poles. A long spine on their backs reaches up and over their heads with a lure. It looks like a worm or fly. Frogfish wiggle their lures to draw unsuspecting fish.

Third, frogfish can inflate their bodies 12 times their normal size. This creates a pressure that they use to suck in prey like a vacuum cleaner. It happens so fast that a single fish can be sucked out of a school unnoticed.

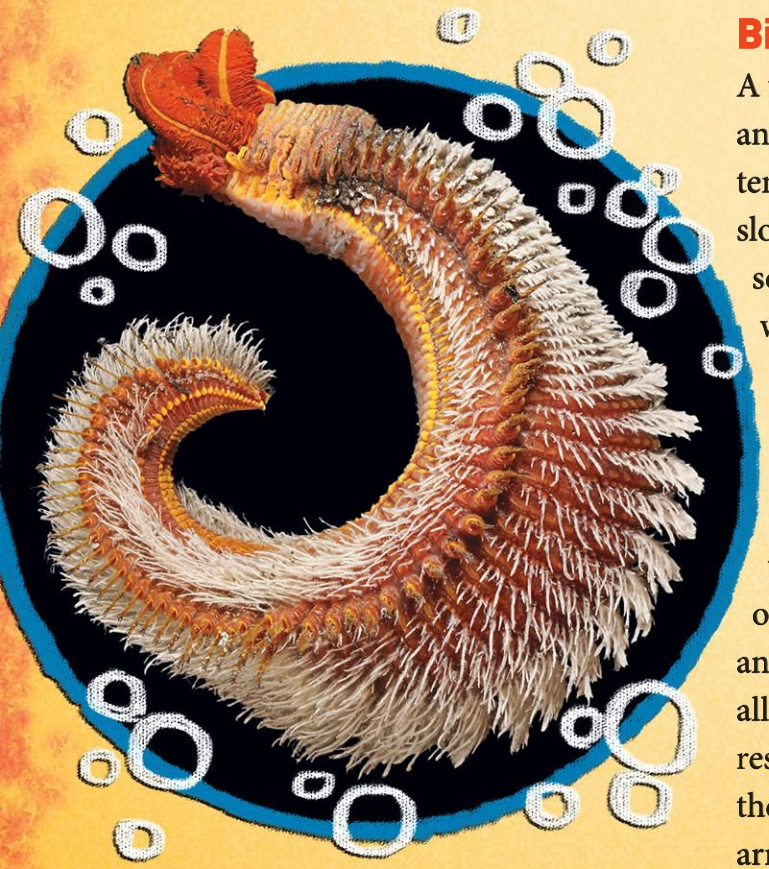
A frogfish's vacuum-like mouth can suck in prey faster than you can blink.

## Hottest Lifestyle

Deep in the Pacific Ocean, there are cracks in Earth's crust. They belch hot lava into the sea. The cracks, called hydrothermal vents, are probably the most extreme environments on the planet. There is no light here. The temperature is scalding hot. This is where the Pompeii worm makes its home.

Pompeii worms live together in colonies. How do they beat the heat? With a winning combination of mucus and bacteria.

The worms release a blanket of thick mucus all over their bodies. The mucus offers a food source for heat-resistant bacteria. Bacteria swarm, eat the mucus, and live on the worms' skin. Together the mucus and bacteria act as a blanket that shields the worms from heat.



Pompeii worms don't mind the heat. They've adapted to live near hydrothermal vents.




Wood frogs freeze solid but don't die during the winter in Alaska.

## Biggest Chill

A wood frog nestles under frozen leaves and grass in Alaska. Winter is coming. The temperature drops. The frog's heartbeat slows. It takes its last breath and freezes solid. But it's not dead! North American wood frogs simply take extreme measures to survive.

Most animals die when they get too cold. If ice forms inside their cells, the cells burst, and the animal dies. But a wood frog's body produces a high level of sugar in its blood. The sugar acts as an antifreeze. It protects the frog by not allowing ice to form inside the cells. The rest of the frog's bodily fluids turn to ice in the spaces between the cells. When spring arrives, the frog thaws. Its heartbeat and breathing return. The frog is as good as new!

## Most Bizarre Defense

Lying in the desert sand like a spiky rock, the Texas horned lizard is motionless. This lizard is a favorite food of lots of hungry desert creatures. Over time, it has developed some extreme adaptations to survive.

A nearby coyote lifts its nose and smells the air. It turns and spots the lizard. So much for camouflage! As the coyote approaches, the lizard hisses and puffs up to look bigger.

The coyote is unimpressed. It pounces and pins the lizard to the ground. Then the lizard launches its extreme defense. As the coyote comes in to bite it, the lizard straightens up. It squirts a stream of nasty-tasting blood from its eyes into the coyote's mouth. This defense has adapted especially to deter attacking coyotes.

### WordWise

**adaptation:** a trait that helps an animal survive in its environment

**clotting:** the action of blood or other liquids turning into a solid mass

**prey:** an animal that is hunted by another animal for food

Here's how it works: A pocket behind the lizard's eyes fills with blood. The lizard squeezes the pouch and squirts the blood. The blood tastes disgusting to coyotes. As the coyote recoils, the lizard escapes.

Whether they are using surprising hunting strategies, finding ways to live in unsafe environments, or avoiding being eaten, some animals rely on extreme adaptations to survive.

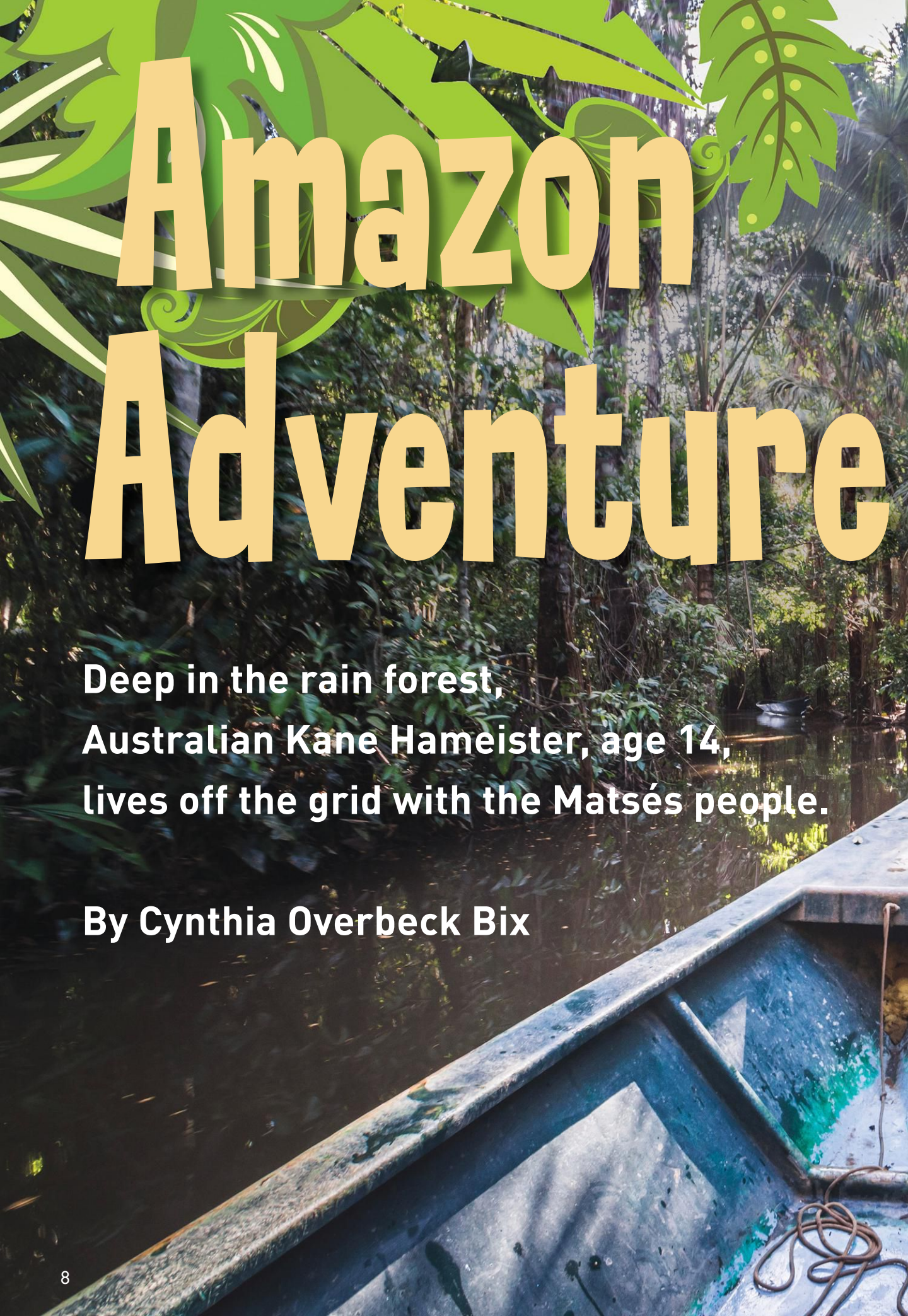
Texas horned lizards can really surprise predators. They squirt foul-tasting blood from their eyes.



# Amazon Adventure

**Deep in the rain forest, Australian Kane Hameister, age 14, lives off the grid with the Matsés people.**

**By Cynthia Overbeck Bix**



## Human Journey

**CULTURE**

As you read, identify an item from the outside world that helps the Matsés people.



Kane squats on the rain forest floor next to Harnan, his guide. A frame of sticks rests over a fire that Kane has built. On top, piranhas roast in the smoke. These fish are fierce predators. But now, they're lunch for Kane and his team.

Kane is deep in the Amazon rain forest in the Matsés (MAT-sess) National Reserve in Peru. Miles away from any towns or farms, the Matsés people live off the grid. No electricity. No plumbing. No cell phones. Just miles of waterways and dense jungle.

Kane traveled through the rain forest for two days to reach this remote village. His companions were his father—Paul Hameister—and photographer Dom Farrell. Their local guides were Sergio; Harnan, chief of the Matsés tribe; and Harnan's father, Armando.

Kane was on a mission to live like the Matsés. What a challenge it would be!




## Challenge #1: Jungle DIY

Like the Matsés, Kane had to **make** many of the things he needed **to survive.** Nature provided all the basic **materials.** Kane just had to learn how to **use them.** His basic tool was a kind of a **knife called** a machete. He used it to chop **down wood** and hack into tough rain for**est vines.** The Matsés use machetes for **making** everything from firewood to **fishing rods.**

Next, Kane learned that if **he wanted** lunch, he was going to have t**o catch or kill** something. His guides taught **him how** to make a fishing rod. Kane **cut a small,** thin tree off at its base. He b**urned it to** strengthen it. Then he peeled back the bark. Then he attached some fishing line and a hook. Leftover meat scraps were used as bait. Kane caught piranhas, wolf fish, and peacock bass. Catching the fish wasn't enough, though. No fire, no dinner. Kane also had to learn to chop up bark for starting a fire.



Kane uses **a machete** to cut down a thin **tree.** With it, he can make a fishing rod.



Kane was successful as a fisherman!

Kane learned other lessons too. His guide showed him how to make a bridge from a fallen log to cross a fast-moving creek. Using long branches as poles for balance, Kane slowly made his way across.

They returned to camp at dusk. Kane was tired and wanted to go to bed. But first he had to build a shelter. He cut two big tree branches, each with a Y at the top, and dug them into the ground. A strong branch between the two Y's made an A-frame for a tarp. He tied down the tarp edges with vines. With palm branches for the floor, he placed his sleep mat under the tarp.

## Challenge #2: Hunting for Supper

The Matsés hunt all kinds of rain forest creatures for food. Pig-like peccaries. Rabbit-sized rodents called pacas. Wild turkeys. To hunt them, they use a bow and arrow.

Matsés bows and arrows are finely crafted, and they are precious. Kane's group had only one bow and one arrow, which belonged to the best hunter. He shared it with everyone.

Kane soon learned how much skill it took to hunt in this way. The bow was as tall as he was. The arrow had two forks on the tip. Because it was the only one, it had to be retrieved after every shot. If it broke, the Matsés fixed the shaft and kept using it.

One night Kane went along on a wild turkey hunt. Kane was amazed by the hunters' skill at tracking animals by sound. They knew exactly which animal made which sound. The Matsés could also mimic, or copy, an animal's call to locate it. Then they moved along noiselessly.

City dwellers Kane and his dad made too much noise as they moved. The Matsés asked them to stay still until they had found the animal or bird they were after.

Suddenly, the guide spotted a turkey. He handed Kane the bow and arrow. *Whoosh!* Kane's arrow just missed, and the bird escaped. A lucky day for the bird, but not one for Kane and the Matsés!



**Kane practices his hunting skills with a bow and arrow.**



**Kane crosses a fast-moving creek on a bridge he helped build from a fallen log.**




This tribe of people revere the jaguar. They pierce their noses with pieces of palms to mimic a jaguar's whiskers.

## Matsés Ways

One day, the group paddled a dugout canoe for nine hours. They wanted to go to a different settlement where the people still follow their ancient ways.

People here pierce their noses with the thin ribs of palm leaves. They are sometimes called the "cat people" because the palm leaves look like the whiskers of jaguars. Men also wear necklaces of jaguar teeth.

Before a hunt, the men here sometimes hold ceremonies to make them strong. In one, an elder blows smoke from a mix of tobacco and cacao (cocoa bean) up the nostrils of another hunter. In another ceremony, men burn their skin and then rub poison into the burned area. Kane did not try those two customs!

## Challenge #3: Snakes and Spiders!

Bullet ant bites feel like fire. Tarantulas grow as big as a man's hand. Giant anaconda snakes slither through the river water. Kane saw many of these during his hikes through the rain forest.

Once, a bullet ant fell down his shirt. He batted at it, but it kept biting him. Poor Kane was dizzy for the next few hours. He was also covered in swollen welts.

One day, the group set out to find an anaconda. Their guide saw one, though Kane did not. But the track it left behind showed it was about 9 meters (nearly 30 feet) long!

One day as they hiked, Kane's guide discovered the tracks of a large adult jaguar. These big cats are the rulers of the rain forest. They are deadly hunters. The guide said they wouldn't get attacked if they stuck together. Still, it was scary.

## End of the Road

After two weeks, Kane's adventure came to an end. His group left the rain forest. It felt strange to see buildings everywhere.

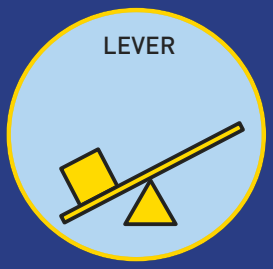
Kane couldn't help thinking about what the Matsés people had taught him. Everything necessary to life could be found in the rich natural world of the rain forest.



Kane found this small caiman while hiking through the rain forest.

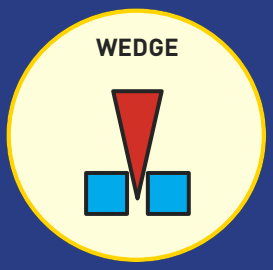
**SIMPLE MACHINES**

*Explorer* magazine's six-part series





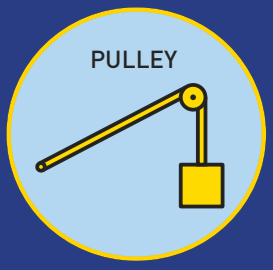










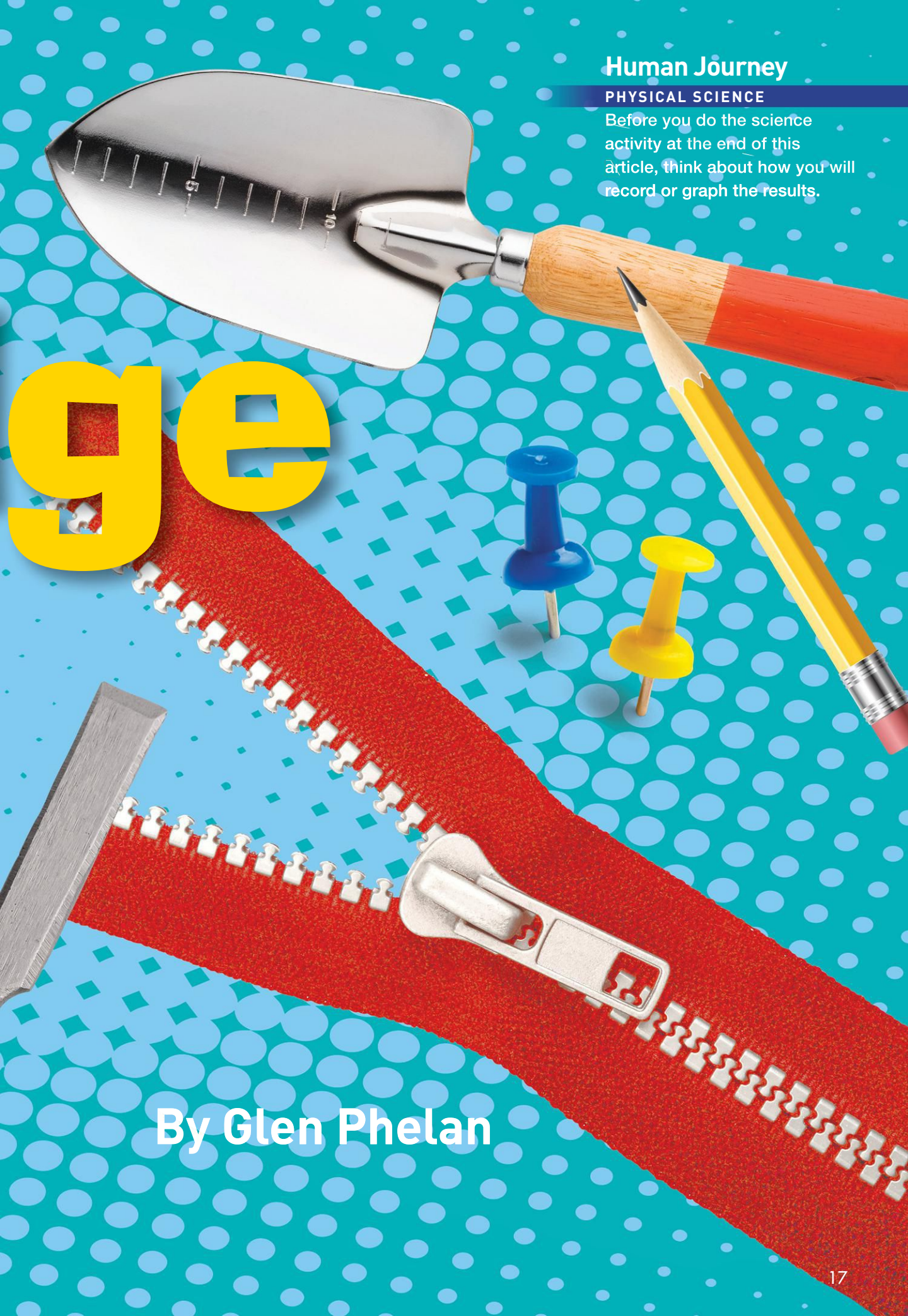




# Split it, lift it, hold it in place. How?

# Wed It!







# ge

## Human Journey

**PHYSICAL SCIENCE**

Before you do the science activity at the end of this article, think about how you will record or graph the results.

By Glen Phelan

**PROBLEM:** You are camping with your family and your best friend. After a day of fun in the sun, you look forward to a night next to a bright, blazing campfire. Especially because it's your turn to help start it!

You and your friend gather some logs and crisscross them in a small pile. Your aunt tries to light one of the logs with a match. Nothing happens. She smiles. "The logs are too big to catch on fire with such a little flame."

"We need smaller pieces," you say. But how? The wood is too hard to break apart with your hands. "We need some sort of tool," your friend says. "Maybe someone in the campground has a saw." All that back and forth sawing could take a while, you think. There must be a better tool.

**SOLUTION:** There is! You remember seeing a small axe in a box of camping equipment. It's the perfect tool for the job!

You bring it to your aunt. She stands a log up and carefully swings the axe so that the blade strikes the cut wood on top. *THWACK!* The log splits to its halfway point. Another swing, and *CRACK!* It splits in two. A few more whacks reduce the half logs to pieces small enough to start the fire. Problem solved!

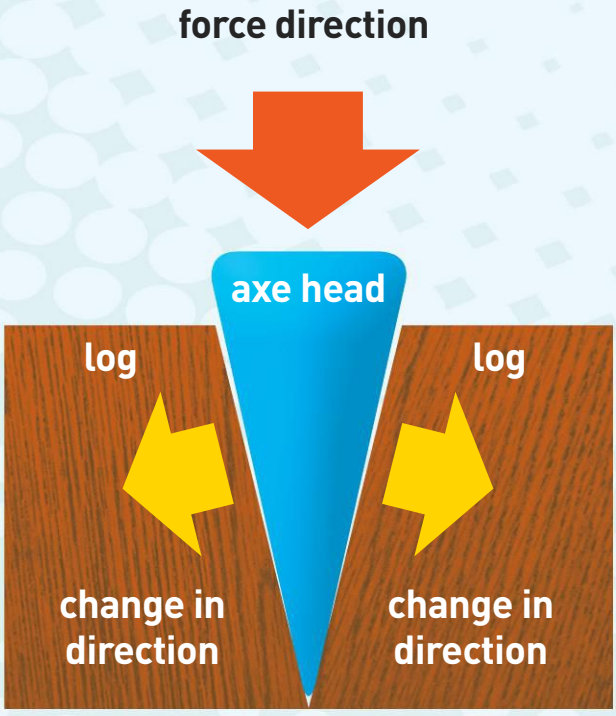
## It's Simple

What makes the axe a good tool to split wood? It's simple! The axe head is a **simple machine.** Like all machines, simple machines help us do jobs, usually by moving things faster, farther, or more easily than we can without them.

You probably don't think of an axe head when you hear the word *machine.* A blender, a car, or a bulldozer might come to mind. But these are all complex machines. They have lots of parts.

Simple machines have only a few parts. In fact, some are made of only one part. Nearly every machine, no matter how complex, contains one or more simple machines.

Simple machines can be combined in endless ways to complete tasks, from pulling a load to flying in space. But each helps us do work all on its own.





With a powerful *CHOP*, this axe splits the wood in two. The axe head is a wedge.

## A Wedge Gives You an Edge

The axe head that you used to split the wood is a simple machine called a **wedge.** It's shaped like a triangle. At first, it might look like a square. But look down at the top of it. The head starts out wide and then narrows to a thin edge. The thinner the edge, the sharper the wedge.

How does it work? It starts with **effort** from you. It takes effort to swing the axe. This effort provides the **force** to drive the axe into the wood.

As you swing the axe, the force moves downward. But as the axe pushes into the wood, the wedge shape directs that force sideways. A wedge redirects force. As the axe drives deeper, the wood moves farther and farther apart, until, with one final *CRACK,* it splits.

## It's All About Trade-offs

Now, suppose you had two axes to choose from. One has a head that is long and narrow. The other is shorter and wider. Which would you choose?

Remember, the thinner the wedge, the sharper the edge. So, the long, narrow axe head will be sharper. Choosing this one is a no-brainer. It will be easier to drive into the wood with each swing.

But here's the thing about a simple machine: There are always trade-offs. The long, narrow axe is easier to push into the wood, but it has to go deeper before it splits the log. The short, wide axe could split the wood without going in so deep. This might mean fewer swings, but each swing would require a lot more force. You trade distance for effort. Not a bad trade!

## Dining with Wedges

Wedges are good for a lot more than splitting wood. They separate all sorts of things. Like food! In fact, you use several wedges every time you eat.

Now, think about what happens when you stick a fork into food, like a piece of broccoli. You use effort to apply a downward force to the fork as you push it into the broccoli. Each tine on the fork directs that force outward. This separates the broccoli and lets the fork go deeper.

Now the fork is in the broccoli. **Friction** between the broccoli and each tine holds it snuggly in place.

Now cut a piece with another wedge—a knife. The blade of a knife is a narrow wedge that lets you slice food easily. After you lift the food to your mouth, your own personal wedges take over—your teeth. Each tooth separates the food into pieces small enough to swallow. The teeth in the front of your mouth are single wedges. The teeth along the sides have high points that are small wedges.

How about ice cream for dessert? You'll want to eat it with a spoon. The edge of the spoon is a wedge and cuts easily through your frozen treat.









## A World of Wedges

Where else besides the kitchen can you find wedges? Let's go on a "wedge hunt" and find out.

Check out most any garage or toolbox. Nails are wedges. So are thumbtacks and push pins. After these wedges are driven into a material, such as wood or cork, friction holds them in place. That's how nails hold pieces of wood together. It's also how your science report stays pinned to the bulletin board.

Lots of garden tools are made of wedges. These include the blades of shovels, hoes, and weeding tools—pretty much anything designed to dig.

Snowplows are wedges that scrape snow off roads. The shape of the wedge allows the plow to reach beneath the snow and lift it off the road.

Some wedges are easy to see. You can see how a sculptor uses a chisel to break off bits of rock while creating a statue. But some tools have wedges hidden inside them. One of these tools is something you probably use every day. It's on pants, jackets, and book bags. Can you guess what it is? It's a zipper!

Closing a zipper is easy, thanks to wedges. When you pull up on the zipper, small wedges inside the slider push the teeth together. When you pull down, another wedge separates the teeth, like a tiny axe splitting wood.

When you pull down on a zipper tab, a small wedge inside the slider pushes the teeth apart.



## Wedges on the Move

So far, most of the wedges you have read about cut through solid **matter,** like wood, soil, and food. But liquids and gases are matter, too. Do wedges cut through this matter? Sure, just look at the front of a boat. The wedge shape of the bow lets the boat slice through the water with ease.

Now consider the narrow front of cars, planes, and trains. The wedge shape makes it easier for these vehicles to push away all the air particles as they move. Then they can go faster and use less fuel.

Wedges are a great idea, but all we're doing is following nature's lead. Think of the sleek shape of dolphins and sharks. Their wedge shape gives them the speed they need to catch prey.

## Back at the Campsite

Now that you know something about wedges, think about some ways you might use this simple machine on a camping trip. Hint: What would you use to roast marshmallows?



Apply the Science

# Which

## What you'll need:

cutting board

block of cheese



variety of tools



safety goggles (The mice have them!)





## Wordwise

**effort:** the force that makes a simple machine do work

**force:** a push or a pull

**friction:** the force of one surface rubbing against another

**matter:** anything that takes up space

**simple machine:** a machine with no more than a few parts

**wedge:** a tool shaped like a triangle

# Wedge?

There are all kinds of wedges, but not every wedge is useful for specific jobs. For instance, an axe was better than a saw for cutting wood, even though the teeth of a saw are wedges.

These mice need to divide a big block of cheese. Which wedge would be best to use? You can try this, too!

**1** The goal is to split the cheese into slices.



**2** The mice try splitting the cheese with a kitchen whisk. Hmmmm...That didn't work so well.



**3** The mice know that the tines on a fork are wedges, so they try a fork next. Stabbing the cheese with a fork breaks the cheese, but it doesn't slice it.



**4** A kitchen knife seems to be the answer!



**5** Now all the mice have a slice of cheese. Which wedge worked best for you?

NATIONAL GEOGRAPHIC | EXPLORER CLASSROOM



# Meet a National Geographic Explorer!

With National Geographic's Explorer Classroom, you and your classmates can talk with a real-life explorer! All sessions are live events hosted on YouTube with no cost to join, and your classroom could be on camera with a change-making scientist, conservationist, or storyteller.

Every Explorer Classroom is different! You could travel to the depths of the Rising Star cave system in South Africa or out to the middle of the eastern tropical Pacific Ocean. If you miss one as it streams live, the recordings are posted on YouTube, so you can tune in later.

**SIGN UP AT NATGEOED.ORG/EXPLORERCLASSROOM**


NATIONAL GEOGRAPHIC
Explorer

SEPTEMBER 2018

DEVELOPMENT
Editorial Director: Richard Easby
Creative Director: Karen Thompson
Editorial Manager: Brenna Maloney
Senior Editor: Corinne Rucker
Media Manager: Jay Sumner
Rights Clearance Specialist: Jean Cantu
Designer: Patrick Cavanagh
Production: Dreama Karnes-Bynane, Emily McKean
Digital Content Platform: H5mag

BUSINESS AND OPERATIONS
Operations Manager: Emily Mallozzi
Project Manager: Erin West Kephart

MARKETING
Marketing Director: James Bosley

NATIONAL GEOGRAPHIC EDUCATION
VP, Global Education Strategy: Lina Gomez
VP, Education Programs: Kim Hulse

Printed by Quad Graphics

PUBLISHED BY NATIONAL GEOGRAPHIC SOCIETY
Interim CEO & President: Mike Ulica
EVP, General Counsel & Corporate Secretary: Angelo Grima
Chief Administrative Officer: Tara Bunch
Chief Scientist & SVP, Science and Exploration: Jonathan Baillie
Chief Marketing & Engagement Officer, SVP Global Strategy: Emma Carrasco
SVP, Partnerships: Leora Hanser
VP, Media Innovation: Kaitlin Yarnall
VP, International: Dave Schacht
Director, Executive HR: Yvonne Perry

NATIONAL GEOGRAPHIC EXPLORER (ISSN 1541-3357) is published seven times during the school year—September, October, November–December, January–February, March, April, May—by National Geographic Society, 1145 17th Street NW, Washington, D.C. 20036. Postmaster: Please send address changes to Attn: Explorer Magazine, National Geographic Society, PO Box 291875, Kettering, OH 45429. Periodical postage paid at Washington, D.C., and additional mailing offices.



Copyright © 2018 National Geographic Society. All Rights Reserved. Reproduction of the whole or any part of the contents of National Geographic Explorer without written permission is prohibited. National Geographic, National Geographic Explorer, and the Yellow Border are trademarks of the National Geographic Society.



Cover: a Texas horned lizard
7/18/QGL/1



**COVER:** © CLAUDIO CONTRERAS/NATUREPL.COM. **EXTREME ANIMALS:** PAGE 2 (TOP) AFRIADI HIKMAL/MOMENT/GETTY IMAGES; (LOW LEFT) GREG ROUSE; (LOW RIGHT) B.G. THOMSON/SCIENCE SOURCE; PAGE 3 (TOP LEFT) WILD HORIZON/UNIVERSAL IMAGES GROUP EDITORIAL/GETTY IMAGES; (TOP RIGHT) DANTE FENOLIO/SCIENCE SOURCE; (BOTTOM) CSP_DONYANEDOMAM/FOTOSEARCH LBRF/AGE FOTOSTOCK; PAGE 4 (TOP) REBECCA HAMBY/MOMENT OPEN/GETTY IMAGES; (BOTTOM) B.G. THOMSON/SCIENCE SOURCE; PAGE 5 (TOP) DAVE FLEETHAM/DESIGN PICS/PERSPECTIVES/GETTY IMAGES; (BOTTOM) STEPHEN FRINK/AURORA/GETTY IMAGES; PAGE 6 (TOP) KITCHIN & HURST/KIMBALL STOCK; (BOTTOM) GREG ROUSE; PAGE 7 GORDON & CATHY ILLG/ANIMALS ANIMALS/AGE FOTOSTOCK. **AMAZON ADVENTURE:** PAGES 8-9 MATTHEW WILLIAMS-ELLIS/ROBERTHARDING/GETTY IMAGES; (INSET) PAUL HAMEISTER; PAGE 10 (MAP) MAPPING SPECIALISTS, LTD; (MACHETE) ROBTEK/SHUTTERSTOCK; PAGES 10-11 (KANE) PAUL HAMEISTER; PAGES 8-15 (LEAVES) EVA105/SHUTTERSTOCK; PAGES 12-13 (KANE WITH BOW & ARROW) DOM FARRELL; PAGE 13 PAUL HAMEISTER; PAGE 14 (MATSES WOMAN) DOM FARRELL; (JAGUAR) © ROLAND SEITRE/MINDEN PICTURES; PAGE 15 (KANE) PAUL HAMEISTER; (PAW PRINTS) MATSABE/SHUTTERSTOCK. **WEDGE IT:** PAGES 16-22 (BACKGROUND) STUDIOSTOKS/SHUTTERSTOCK; PAGE 16 (TOMATO & FORK) BERND SCHMIDT/SHUTTERSTOCK; (CHISEL) VLADIBULGAKOV/SHUTTERSTOCK; PAGES 17 (TROWEL) THAMMASAK LEK/SHUTTERSTOCK; (PENCIL) FEDOROV OLEKSIY/SHUTTERSTOCK; (PUSH PINS) FABRIKASIMF/SHUTTERSTOCK; (ZIPPER) BAO-IMAGES BILDAGENTUR/SHUTTERSTOCK; PAGE 19 CONNOR WALBERG/THE IMAGE BANK/GETTY IMAGES; PAGE 20 (SNOWPLOW) STEPHANIE HOWARD/THE IMAGE BANK/GETTY IMAGES; (GARDEN TOOLS) DEREK HATFIELD/SHUTTERSTOCK; (FLATWARE) REALSTOCKVECTOR/SHUTTERSTOCK; (BROCCOLI) SIAN IRVINE/DORLING KINDERSLEY/GETTY IMAGES; (PUSH PIN) FABRIKASIMF/SHUTTERSTOCK; PAGE 21 (STONE CARVER) KZENON/SHUTTERSTOCK; (ZIPPER) OLIVER CLEVE/PHOTOGRAPHER'S CHOICE/GETTY IMAGES; PAGE 22 TOMMI KOKKOLA PHOTOGRAPHY/MOMENT/GETTY IMAGES; PAGES 22-23 (WHICH WEDGE?) MARK THIESSEN/NGS STAFF. **BACK PAGE:** JOE GRABOWSKI.


To find your Explorer Magazine online resources or for questions visit:
**NatGeo.org/ExplorerMag**

FURTHER

# Ancient Greece

About 2,500
the most im

## Geography

Greece is made up of a peninsula at the southernmost tip of Europe and many islands scattered across the Aegean and Adriatic seas. It is mountainous with hot, dry summers and rain only in winter.



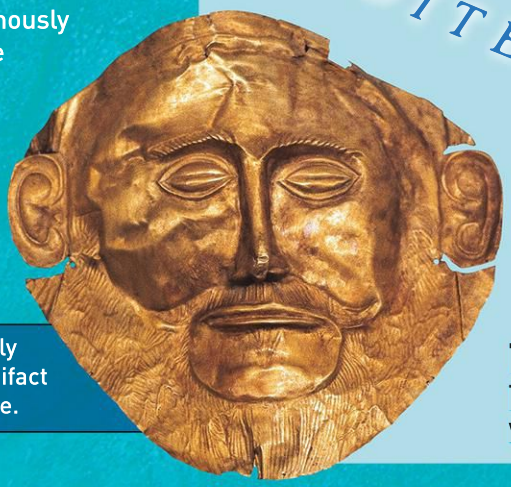
## Ships and Trade

The ancient Greeks relied on the ocean for food, trade, and exploration. Greek sailors had small rowboats for fishing, big trading ships, and fast warships.




## The Mycenaeans

The Mycenaeans were a great civilization of traders and soldiers on the mainland from 1600 to 1100 B.C. They famously fought in the battle of Troy. Homer, an important Greek writer, told their story in his books the *Iliad* and the *Odyssey*.



This mask is probably the most famous artifact of Mycenaean Greece.

**The Minoans** were the first great Greek c
They lived on the island of Crete, from 2200 to 1
were named after their legendary king, Minos.

[MAP] ROBERT PRATT, [SHIP] MARATHON RUNNER, MINOTAUR ART] STEVE MCCRACKEN, [MAP INSET] MAPPING SPECIALISTS, LTD., [GOLD MASK] DE AGOSTINI/A. VERGANI/DE AGOSTINI PICTURE LIBRARY/GETTY IMAGES, [ALEXANDER THE GREAT] PACO GOMEZ GARCIA/AGE FOTOSTOCK

0 years ago, Greece was one of
nportant places in the world.

NATIONAL GEOGRAPHIC
Explorer

Copyright © 2018, National Geographic and the Yellow Border are registered trademarks of the National Geographic Society.

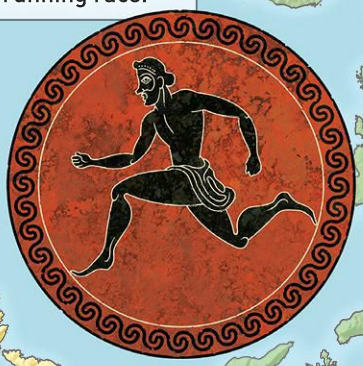



Aegean Sea

Troy

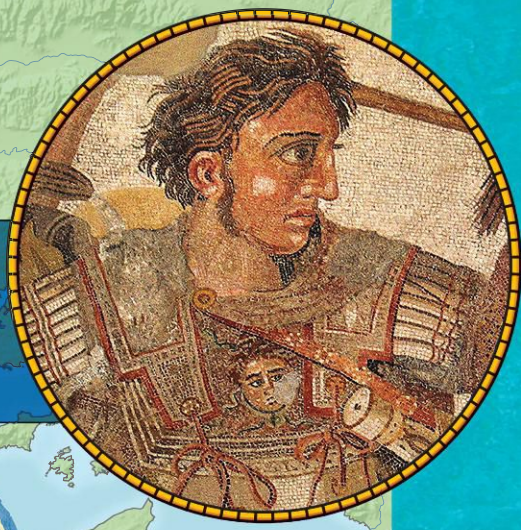
PERSIAN EMPIRE

**Marathon** was the site of a great battle in 490 B.C. The outnumbered Greeks defeated the Persian army. A messenger ran to Athens to spread the victory news. This is the origin of the marathon running race.



Marathon

Athens



Only a very powerful ruler could control all of Greece. One man did in the 300s B.C. He was **Alexander the Great,** from Macedonia. He led his army to conquer an empire that stretched as far as India.

Athens was a key place in Greece from 500 to 400 B.C. Some of Greece's most important thinkers, artists, and writers lived here. Athens was also the world's first democracy.



**Knossos** was the oldest city and the center of the Minoan civilization.

Legend has it that Knossos was home to a man-eating bull, called the **Minotaur.** It roamed the palace labyrinth, an elaborate maze.

•Knossos

CRETE

ivilization.
450 B.C. They

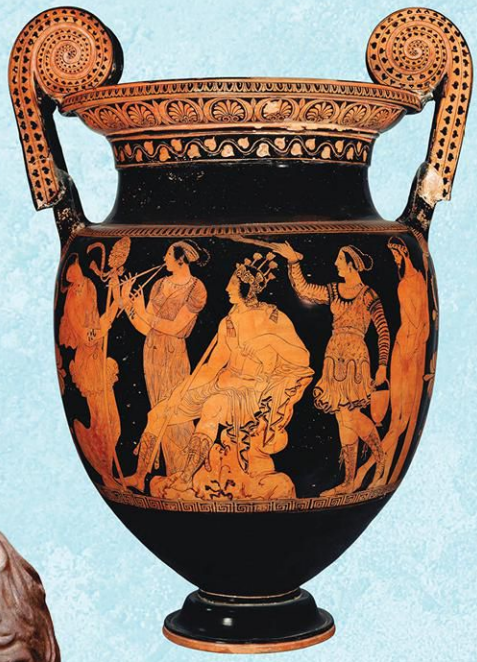
# Life in Ancient Greece

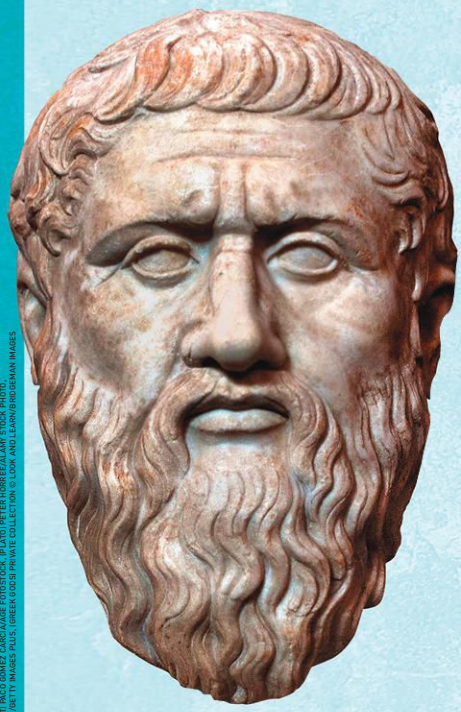
The anc
artists,
Their ci
other da

## Art and Artisans

The Greeks were famous for their clay pots. They came in many shapes and sizes depending on their purpose. They were often beautifully decorated with scenes from daily life.

The Greeks were really good at making statues, too. Master sculptors carved life-like statues out of a rock called marble.





## Great Thinkers

The Greeks created a new way of thinking that emphasized logic, reasoning, mathematics, and careful observation. Plato (on the left) and Socrates were famous thinkers of the time. Hippocrates, a doctor, and Archimedes, an inventor and mathematician, were well-known scientists.

## Watchful Gods

The Greeks believed that gods and goddesses watched over them from Mount Olympus. Every city had a favorite god or goddess. People believed the gods protected them from harm. To please the gods, people brought gifts of money, flowers, food, and drink to temples like the Parthenon.

## Bold Builders

The ancient Greeks had a grand style
The Greeks believed that the secret to
designed their buildings, making sure

**frieze:** a decorative panel of sculpture



## THE AGES OF ANCIENT GR



**2000 B.C.**
Minoan civilization centered on the island of Crete



**1350 B.C.**
Mycenaean civilization emerges

## Greek Gods

**Zeus:** king of the gods; father of many children

**Poseidon:** broth
and Hades; god



Athena Heracles Apollo

(MINOTAUR, SHIP, RUNNER) STEVE MCCRACKEN, (GOLD MASK) DEA/BIBLIOTECA AGOSTINI PICTURE LIBRARY/GETTY IMAGES, (ALEXANDER THE GREAT) PACO GOMEZ GARCIA/AGE FOTOSTOCK, (PLATO) PETER HORREE/ALAMY STOCK PHOTO, (POTTERY) LEEMAGE/CORBIS HISTORICAL/GETTY IMAGES, (PARTHENON) LOTHAR SCHULZ/GETTY IMAGES, (COLUMNS) ART_MISTOCK/GETTY IMAGES PLUS, (GREEK GOD) PRIVATE COLLECTION © LOOK AND LEARN/BRIDGEMAN IMAGES

NATIONAL GEOGRAPHIC Explorer

Copyright © 2018. National Geographic and the Yellow Border are registered trademarks of the National Geographic Society.

tient Greeks were great thinkers, warriors, athletes, and politicians. They were also great builders. ties had beautiful temples, open-air theaters, and azzling public buildings.

of architecture that is still copied today.
o making a great building was math. They carefully e all the angles, shapes, and sizes were just right.

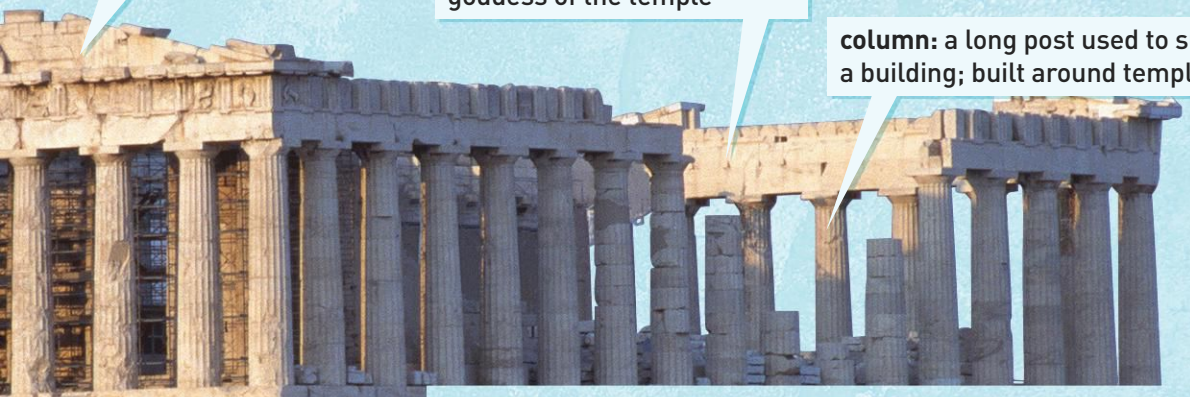
Greek temples were held up with three styles of stone columns: Doric, Ionic, and Corinthian.




**pediment:** a triangle-shaped area with more sculpture

**inner chamber:** a room that held a statue of the god or goddess of the temple

**column:** a long post used to support a building; built around temples



The most famous Greek temple is the Parthenon in Athens. It was built for the goddess Athena.

## REECE



**1250 B.C.**
Trojan War is fought

**750 B.C.**
Greek city-states, such as Athens, emerge

**700 B.C.**
Homer writes the *Iliad* and the *Odyssey*



**508 B.C.**
Athens creates a democracy



**326 B.C.**
Alexander builds his empire

**86 B.C.**
Rome conquers Athens

ner of Zeus
of the sea

**Hermes:** son of Zeus; messenger of the gods

**Hera:** queen of the gods; wife of Zeus

**Hades:** brother of Zeus; ruler of the underworld



Poseidon Hermes Dionysus Hera Zeus Hades