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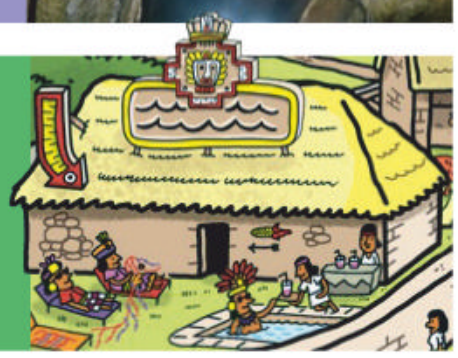

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weird but true!

Check out these outrageous facts.

BY JULIE BEER AND MICHELLE HARRIS

ANYONE SEEN MY HAND WEIGHTS?

Male kangaroos flex their arm muscles to impress females.

THE PLANET KEPLER-413B wobbles like a **SPINNING TOP.**

SOME KINDS OF **APPLES** ARE PINK ON THE INSIDE.

HERDS OF **BUFFALO-SIZE RODENTS** ONCE ROAMED **SOUTH AMERICA.**

GIANT CUTTLEFISH have **BAGEL-SHAPED BRAINS.**

Caribou release an odor from their **ankles** when threatened.

Your **glabella** is the area of skin between your eyebrows.

One indoor soccer match in Alberta, Canada, lasted for 30 hours.

A billboard in **Riyadh, Saudi Arabia,** stretches the length of **9 basketball courts.**

CHECK OUT THE BOOK!

© DAVE WATTS / ALAMY STOCK PHOTO (KANGAROO); BLUEBERRY_PANCAKES / SHUTTERSTOCK (APPLES); ANTONIO CAMACHO / GETTY IMAGES (CUTTLEFISH); CREATISTA / SHUTTERSTOCK (EYEBROWS)

GUINNESS WORLD RECORDS

BY KAY BOATNER

OOH-WORTHY EYES

A PEACOCK MANTIS SHRIMP WALKS ON A ROCK IN THE CELEBES SEA IN SOUTHEAST ASIA.

The mantis shrimp might have the coolest eyes *your* eyes have ever seen. These crustaceans, which live in tropical and subtropical waters worldwide, hold the record for having the most complex eyes in the animal kingdom. Almost all animals have color receptors, which help them tell different colors apart. But these shrimp have more color receptors than other animals, including humans. That's why only mantis shrimp can see a type of light that reflects special patterns off their shells. And that helps them find a mate or avoid a fight with another shrimp. These creatures are definitely something you have to see to believe.

TOWER OF ICE-POP STICKS

How many ice-pop sticks does it take to create the world's tallest ice-pop-stick structure? Nearly 2,000 of them! With his father's help, Eric Klabel glued 1,750 of these sticks together to create a 20-foot-tall tower. (That's slightly taller than an adult giraffe.) These builders are probably ready for a different sweet treat.

BEARD GROWS PENCILS

Good thing Joel Strasser didn't shave for six months. That way, his beard could hold 456 pencils! Strasser took an hour and 10 minutes to place the pencils—but less than 10 seconds to shake them out once he broke the record for the most pencils in a beard. Strasser's secret? He placed each of the pencils *very* slowly. Time to break out the shaving cream.

STRASSER PLACES PENCILS IN HIS BEARD.

IMAGEBROKER / ALAMY (MANTIS SHRIMP); GUINNESS WORLD RECORDS LIMITED (KLABEL, STRASSER). INFORMATION PROVIDED BY © 2023 GUINNESS WORLD RECORDS LIMITED.

Bet You Didn't Know!

6 splashy facts about marine mammals

BY PAIGE TOWLER

1 **Manatees** are related to **elephants.**

2 **Polar bears** have **webbed feet** that help them **swim** for long distances.

3 **Sea otters** have the **thickest fur** of any mammal.

4 One-half of a **dolphin's brain** is always awake.

5 Male **Steller sea lions** sometimes blow **bubbles** to show who's the boss.

6 Sometimes called **sea canaries, beluga whales vocalize a lot—** whistling, chirping, squealing, and even **mooing.**

ALEX MUSTARD / NPL / MINDEN PICTURES

BRAiN CANDY

BY JULIE BEER AND MICHELLE HARRIS

Some sports teams have UNUSUAL MASCOTS.

CHECK OUT THE BOOK!

The **University of California, Santa Cruz,** is home to the **BANANA SLUGS.**

The **BOLL WEEVIL—** a beetle pest to cotton growers—is the mascot of the **University of Arkansas at Monticello.**

The **Colorado Rockies** baseball team chose a dinosaur as their mascot after workers found a ***TRICERATOPS*** skull while building the team's stadium.

AFRICA STUDIO / SHUTTERSTOCK (BASKETBALL); MEL / ADOBE STOCK (BANANA SLUG); BESTV / SHUTTERSTOCK (FOOTBALL); PHOTONCATCHER36 / ADOBE STOCK (BOLL WEEVIL); IASHA / SHUTTERSTOCK (BASEBALL); LEONELLO CALVETTI / SHUTTERSTOCK (*TRICERATOPS*)

AMAZING ANIMALS

DID I SWIPE MY TROLLEY PASS?

Trolley

Train

Ferry

Dog Rides Trolleys (and Trains and Ferries)

Istanbul, Turkey

Subway riders in this busy city often shared their trip with an unusual passenger: Boji the Anatolian shepherd mix! The dog would wait patiently on a station platform for the train doors to open, then find a seat until he was ready to, uh, debark.

The stray dog has been well known to passengers on subway trains, trolleys, and ferries. Human riders would pet the friendly pup and leave food for him at different stops. "Boji always knew where he was going," says photographer Chris McGrath, who spent a day following the dog. "He moved so fast—it was hard to keep up with him!"

In 2021, city officials put a microchip tracker in Boji and found out the pooch passed through at least 29 stations each day. So why'd he take all that public transportation? "Boji was well rewarded for his unusual behavior with food, warmth, safety, and affection," animal behavior expert Suzanne MacDonald says.

But Boji doesn't need to ride the rails anymore: In 2022, the dog was adopted by a local businessman! —*Rachel Ng*

THE TAG ON BOJI'S EAR MEANS HE'S NEUTERED AND VACCINATED. (STRAY DOGS ARE PROTECTED BY LAW IN TURKEY.)

Eastern quolls can have six joeys at a time.

COMEBACK CRITTER:

Eastern Quoll

Barrington Wildlife Sanctuary, Australia
Conservationists walked around the fenced-in wildlife sanctuary looking for eastern quolls. Over the past few years, a group called Aussie Ark has released 80 eastern quolls here, and the workers wanted to see how they were doing. They found good news: "Every single female that we've checked has had joeys in her pouch," Aussie Ark supervisor Tyler Gralton says.

These quolls are the first to raise their offspring in a natural space on mainland Australia in 60 years. That's because 200 years ago, hungry cats and foxes arriving on boats preyed on the kitten-size critters. By 1963, eastern quolls were declared extinct here. But a small group of quolls remained safe on Tasmania, a nearby island.

So four years ago, Aussie Ark created a 1.5-square-mile sanctuary on the mainland, free of predators. They released Tasmanian quolls into this refuge, where the critters can roam open grassland and forests alongside other native animals like wallabies and gliders.

The 63 joeys that conservationists recently discovered are like a quoll baby boom. Gralton says, "When quolls have a habitat where they're safe from unnatural predation, they do really well." —*Rachel Ng*

ADULT QUOLLS HANG OUT IN A LOG AT THE SANCTUARY.

Check out more stories, tips, and crafts to help the planet!
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SAVE THE EARTH

Goats 'Fight' Fires

Whittier, California
To help bust wildfires, some Californians are "hiring" four-legged firefighters: goats! Their pay? Tasty invasive plants called black mustard.

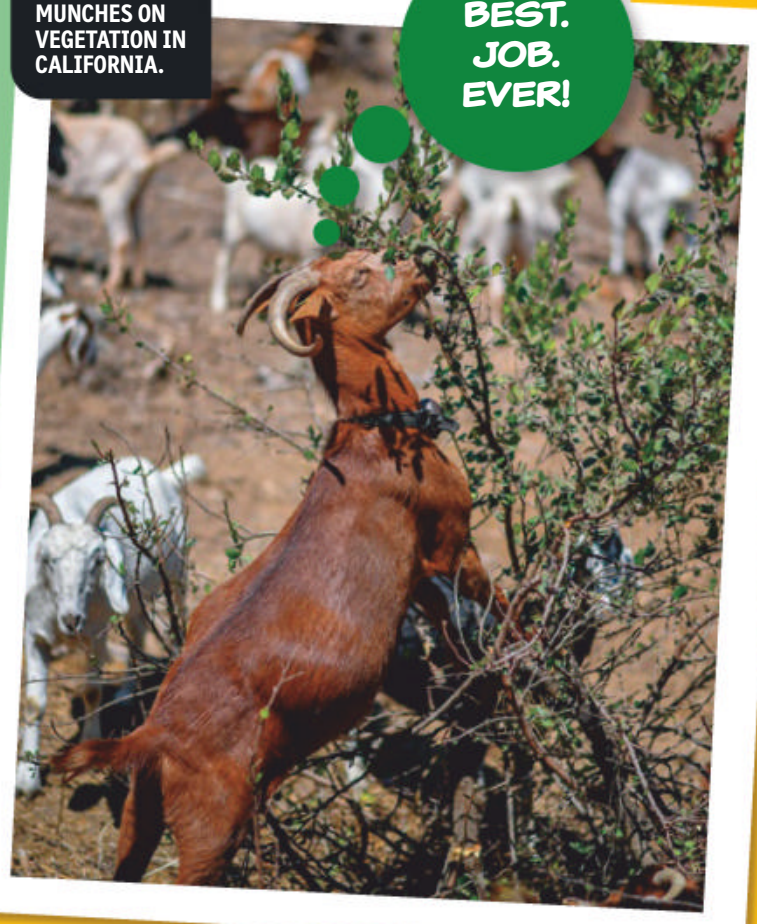
These weeds were brought to California from Spain in the 1700s. But black mustard overgrows native plants (the invasive plant can reach eight feet tall), then releases lots of seeds before dying. The seeds sprout new plants, and the dry, dead plant matter is fuel for dangerous wildfires.

These helpful goats happily eat black mustard, even on steep hillsides that other animals and people can't reach. Even better: The seeds are no longer active once they pass through the goats' tough digestive tract.

"The seeds don't grow after they come out the other end," says Alissa Cope, who owns a company that sends out goats. These chompers are champs! —*Chris Iovenko*

A HIRED GOAT MUNCHES ON VEGETATION IN CALIFORNIA.

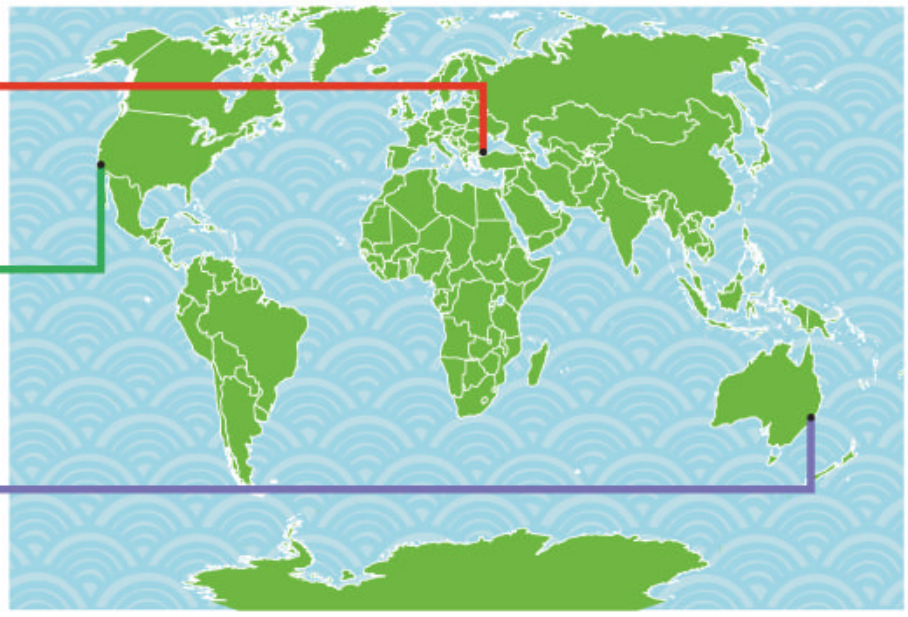
BEST. JOB. EVER!



DOG
Istanbul, Turkey

GOATS
Whittier, California

EASTERN QUOLLS
Barrington Wildlife Sanctuary, Australia



"GOATS 'FIGHT' FIRES" TEXT ADAPTED FROM A JUNE 2022 NATIONAL GEOGRAPHIC ONLINE ARTICLE. CHRIS MCGRATH / GETTY IMAGES (BOJI, ALL); AUSSIE ARK (SINGLE QUOLL); DAVID STOWE (QUOLLS IN LOG); ROBYN BECK / AFP VIA GETTY IMAGES (GOATS, BOTH)

ANIMAL POACHERS BUSTED

How cool technology is protecting endangered sea turtles

BY BETHANY AUGLIERE

It's after midnight, and the Costa Rican beach seems deserted. But a poacher sneaks onto the sand, quickly digging into a green sea turtle nest and scooping up as many eggs as he can. He's going to illegally sell them to make money.

But scientists know something the thief doesn't: One of the eggs is fake; a tracking device had been planted inside of it just a few hours earlier.

Dressed in all-black to avoid being seen, researchers had hidden the decoy egg inside this turtle nest, hoping a poacher would steal it. Now that one has, the scientists can track who's poaching the eggs, where the eggs travel—and where they end up.

A GREEN SEA TURTLE SWIMS OFF THE COAST OF COSTA RICA.

The scales on a sea turtle's shell are called scutes.

Sea turtles can't pull their heads and limbs into their shells like land turtles can.

POACHING PROBLEM

Some people pay big bucks for sea turtle eggs, even though buying and selling them is illegal. (All seven species of sea turtles are endangered or vulnerable.) A single egg can be purchased for up to $300, mostly to eat in restaurants and private homes.

Fewer eggs mean fewer hatchlings—and that means trouble for sea turtles. Trafficking, or illegally selling, is a big problem in Central American countries like Costa Rica, where poachers can destroy 90 percent of nests on a single beach.

"Green sea turtles can lay up to 120 eggs at a time," conservationist Helen Pheasey says, adding that olive ridleys can lay up to 110 eggs. "Poachers sometimes steal more than a hundred eggs from just one nest."

That's why Paso Pacífico, a conservation organization working to save local sea turtles, came up with a creative solution: planting fake sea turtle eggs with tiny trackers into turtle nests.

CONSERVATIONIST HELEN PHEASEY PREPARES TO PLACE A FAKE EGG IN AN OLIVE RIDLEY SEA TURTLE'S NEST.

VICTOR LANNEAU / ALAMY (MAIN); OTTO WHITEMAN (PHEASEY WITH EGG); MARTIN WALZ (MAP)

The plan isn't just to catch the poachers, though. Experts want to know *where* these eggs are going.

"Then," Pheasey says, "we can get a better sense of the trafficking routes and where the eggs are being sold."

BUILDING THE PERFECT EGG

First, scientists had to figure out how to build fake green and olive ridley sea turtle eggs that looked—and felt—real. "They have a kind of leathery outer shell and then a squishy interior," conservationist Kim Williams-Guillén says.

Williams-Guillén and other scientists eventually used a material called Ninja-Flex, which they printed with a 3D machine. Carefully squishing it open, they placed the GPS tracker inside, then sealed it with glue. "It looks pretty close to the real thing," she says.

Next, scientists searched a Costa Rican beach for nesting sea turtles. Once the team found one, they waited for the turtle to lay her hundred-plus eggs the size of Ping-Pong balls in the hole she'd dug.

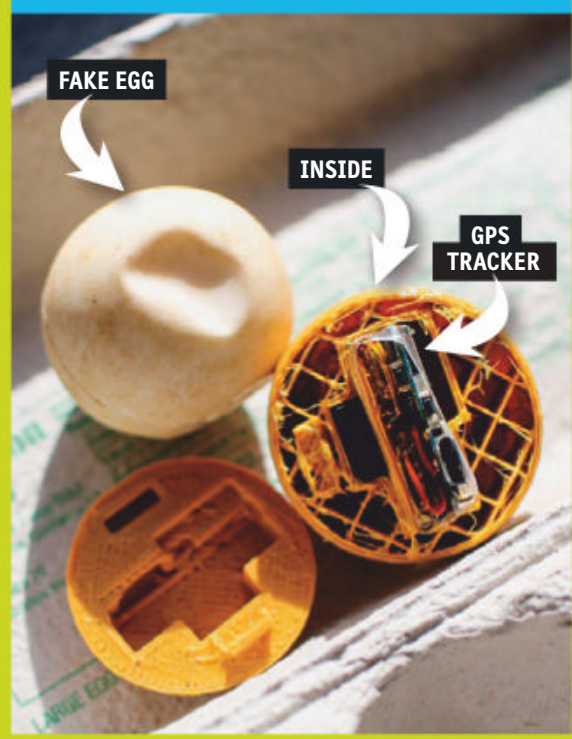
"We slipped in a fake egg when the female was about halfway through laying, so it was hidden in the middle of the nest, among all the other eggs," Pheasey says. "That makes it harder for poachers to detect it."

The team placed one fake egg in 101 green and olive ridley sea turtle nests throughout beaches on the Caribbean and Pacific coasts of Costa Rica. Twenty-five of their fake eggs were taken by poachers. These eggs transmitted GPS locations to the scientists' phones, which meant they could view the trafficking routes almost in real time.

By watching where the eggs went, the team identified five paths used often by the poachers. "This allowed us to get a sense of what the local trade route looked like," conservationist Sarah Otterstrom says.

TRACKING THE EGGS

One thing that surprised researchers was how far the eggs were traveling.



A fake sea turtle egg holds a tiny GPS tracker, which will send a signal to scientists' phones.

Real eggs surround a fake one on a Costa Rican beach. If a poacher steals it, scientists can track where it goes.

FEMALE OLIVE RIDLEY SEA TURTLES COME ASHORE TO LAY THEIR EGGS AT A BEACH IN COSTA RICA.

Before they created the fake eggs, scientists assumed most eggs were being sold locally. But one egg actually went farther inland to a city about 85 miles away. (See map below.)

The goal for scientists is to collect enough data to identify the individuals trafficking and paying for the stolen sea turtle eggs. If authorities can charge enough of these people with crimes, the poachers and buyers might be less likely to steal and illegally purchase sea turtle eggs.

Experts know that most poachers are poor and just trying to make money. That's why the Paso Pacífico team is more interested in busting the people at the top to cut down on the demand for eggs from the poachers. To do this, they're continuing to collect data in Costa Rica and telling local law enforcement where the fake eggs end up.

The researchers also want to make more fake eggs for conservationists working in other countries. The technology could also be used to protect other egg-laying species, like crocodiles.

Williams-Guillén loves that this project excites people and hopes that local communities continue to value saving all seven species of sea turtles. "We need everyone's help to protect these animals," she says.

A GREEN SEA TURTLE HATCHLING CROSSES A BEACH IN COSTA RICA.

PLAY A SEA TURTLE MATCHING GAME!
natgeokids.com/june-july

EGG ON THE MOVE

Scientists used GPS devices planted in fake sea turtle eggs to track the poachers' route. This map shows the 85-mile path that one decoy egg traveled.

THE FRAMED AREA IS ENLARGED ON THE RIGHT.

Egg route
4 hours, about 85 miles

Where the egg sent a signal back to scientists

GOOD MAGAZINE (FAKE EGG INTERIOR); KIM WILLIAMS-GUILLÉN / PASO PACÍFICO (FAKE EGG IN PILE); NICK HAWKINS / NPL / MINDEN PICTURES (HATCHLING); ROLAND SEITRE / MINDEN PICTURES (TURTLES ON BEACH); MARTIN WALZ (MAP)

MEET THE SEA TURTLES

Sure, all sea turtles have shells and flippers. But each of the seven species stands out in its own way. Check out some fun facts about all of them.

THE NEAT FREAK

Some **green sea turtles** stay clean by visiting a turtle wash! Turtles choose a "cleaning station," where groups of cleaner fish stand by to groom the turtles. The fish eat the algae, barnacles, parasites, and other ocean gunk from the turtles' shells and skin.

THE PROTECTIVE MOM

Every year, thousands of female **olive ridley sea turtles** take over beaches. Called an *arribada* ("arrival" in Spanish), they gather in the water before and after coming ashore to lay eggs. Why? Thousands of turtles nearby can fend off predators trying to snatch the eggs.

THE WORLD TRAVELER

After leaving their nesting site, some **loggerhead sea turtles** swim up to a third of the way around the world. Named for their large heads that look sort of like a big log, loggerheads travel as far north as Canada and as far south as Argentina.

THE EXTREME EATER

Hawksbill sea turtles have an unusual diet: sponges. Their hawklike beaks (which is what they're named for) pluck sponges from the cracks and crevices of coral. Most animals can't eat the toxic sponges, but this turtle gobbles about 1,200 pounds of them a year.

THE HOMEBODY

Unlike its globetrotting cousins, a **flatback sea turtle** sticks close to home. This rare turtle nests only on remote beaches of northern Australia and spends its day floating in the water and basking in the sun. Seabirds often perch on the backs of floating flatbacks!

THE "LITTLE" ONE

The **Kemp's ridley** might be the smallest sea turtle, but that doesn't mean it's tiny. The 70- to 100-pound adult reptile weighs more than most 10-year-old kids, and its shell is about the size of a car tire. These "little" turtles also build their nests in about 50 minutes, less than half the time it takes other sea turtles.

THE MEGA-TURTLE

What's as big as a door? A **leatherback's** leathery shell, which can be six feet long and four feet wide. Weighing about 1,500 pounds, these giants are heavier than any other sea turtle species. (One leatherback weighs as much as six pro football players!)

SOLVIN ZANKL / NATURE PICTURE LIBRARY (MAIN); LUCIANO CANDISANI / MINDEN PICTURES (GREEN SEA TURTLE); TUI DE ROY / MINDEN PICTURES (OLIVE RIDLEY); DOUG PERRINE / NPL / MINDEN PICTURES (LOGGERHEAD, FLATBACK); BECCA SAUNDERS / AUSCAPE / MINDEN PICTURES (HAWKSBILL); NPS PHOTO / ALAMY (KEMP'S RIDLEY); WIL MEINDERTS / BUITEN-BEELD / MINDEN PICTURES (LEATHERBACK)

Sea turtles munch mostly on algae, seagrasses, crabs, and conchs.

Sea turtle hatchlings are less than three inches long.

AN OLIVE RIDLEY HATCHLING SWIMS FOR THE FIRST TIME OFF A COSTA RICAN BEACH.

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THE TRUTH BEHIND THE NEW MOVIE

Elemental

BY STEPHANIE WARREN DRIMMER

In the new movie *Elemental,* residents made of fire, water, earth, and air live in different districts throughout Element City. But when Ember, who's made of fire, needs to save her parents' store, she must work with a city inspector named Wade, who's made of water.

"We used real science to inspire how these two characters—along with characters made of earth and air—behave in the film," director Peter Sohn says. But how much are Ember, Wade, and other residents like the natural elements they're modeled after? *Nat Geo Kids* goes behind the scenes to find out.

Plant Power

An earth character named Clod, who's mostly made of soil and grass, tries to impress his crush, Ember, by sprouting flowers in his armpits. Soil is important for helping flowers grow in real life, too. Gardeners plant seeds in soil because the dirt contains elements that plants need to grow. For instance, nitrogen in soil helps leaves sprout; potassium keeps stems healthy.

CLOD

PIXAR ANIMATION STUDIOS (ALL). THE WALT DISNEY COMPANY IS MAJORITY OWNER OF NATIONAL GEOGRAPHIC MEDIA.

The ancient Greeks believed that everything in the world was made up of just four things: fire, water, earth, and air.

Modern scientists think that all matter is actually made up of at least 118 chemical elements.

These 118 elements are organized in a chart called the periodic table. "We hid a periodic table in the film," director Peter Sohn says. "It'll be fun to see how many viewers can spot it."

Going Up

The citizens of Element City share a favorite sport: airball. In this basketball-like game, athletes made of air (see character at left) zoom around a stadium, floating up and down like clouds as they try to swish a ball through a hoop. Clouds rise and fall in real life, too.

Clouds form when an invisible gas called water vapor—the thing that fogs up your shower—rises into the sky. As it climbs, the surrounding air cools the water vapor until the vapor turns into tiny liquid water droplets. Billions of these droplets form on super-small particles like dust that are already floating in the air. When those droplets bind together, a cloud forms. The cloud keeps rising until it has so many particles that the cloud becomes heavier than the air around it. Once that happens, the cloud starts to fall.

Water Works

Wade tries to hide his job as a city inspector from Ember's father by covering his name tag with his watery hand. But that only makes the words appear larger. The movie gag is based on a scientific principle called refraction. Your brain "sees" objects after rays of light reflect off those objects to your eyes. That light usually moves in a straight line. But water causes the light rays to bend as they pass through. That can make objects seen through water—like a rock on the bottom of a pond—seem bigger than they really are.

Rainbow Flames

Ember and Wade visit a lake where she hops from stone to stone, her flames changing color with each leap. "A cool thing I learned making this movie is that if you add the right element, fire can be almost any color," Sohn says.

When heat excites the atoms of an element, the atoms' electrons gain energy. Then the electrons release that energy as particles of light. Those particles are called photons. Depending on the element, those photons will appear as different colors. For instance, if you throw table salt—which is made up of the elements sodium and chloride—into a fire, the flames turn yellow. The element boron creates green flames, and the element bismuth makes blue ones. (But definitely don't try this at home!)

EMBER

WADE

10 Cute Animals

We dare you not to fall in love with these adorable critters.

BY KATE HALE

WHITE RHINOCEROS

A rhino's feelings wouldn't get hurt if you called it a name. (Not that you would.) They have thick skin—literally. About an inch thick, rhino skin is built to protect the animal from thorns and biting flies in its African home. A rhino's size is nothing to mess with, either. One of the world's biggest babies, rhinos can weigh 140 pounds at birth, gaining four pounds every day until they reach about 4,500 pounds. Hugely adorable!

RED PANDA

Bamboo, *delish!* These "fire foxes," as they're sometimes called, dine on bamboo like their black-and-white namesake does. But unlike giant pandas, Asia's red pandas have cute white whiskers. The sensitive hairs help the pandas navigate narrow spaces, especially at night.

CHIPMUNK

This North American rodent stays alert while it fills its cheek pouches with everything from seeds and nuts to worms and bird eggs. If danger comes along, it calls loudly to warn other chipmunks.

MEERKAT

Native to parts of Africa, meerkats are constantly on alert for predators such as jackals and falcons. Clever critters, meerkats all have different jobs within their group, including guard duty and babysitting. Everything gets done by working as a team. *Hakuna matata!* No worries!

WATCH CUTE ANIMAL VIDEOS.
natgeokids.com/june-july

© WILDLIFE GMBH / ALAMY (RED PANDA); © JOE & MARY ANN MCDONALD / KIMBALL STOCK (RHINOCEROS); BRIANLASENBY / GETTY IMAGES (CHIPMUNK); TAMBAKO THE JAGUAR / FLICKR / GETTY IMAGES (MEERKAT)

HARVEST MICE

With its teeny puffball body and its button nose, the harvest mouse is the smallest (and possibly cutest) rodent in Europe. Longer than its body, its prehensile tail helps the mouse grip, hold, hang from, and climb the tallest grass or twig. Sometimes young mice even link their tails together—like BFFs.

NORTH AMERICAN PORCUPINE

Baby porcupines might look cuddly, but they'll soon have the ultimate defense—quills! The soft, bendable hairs that make the youngster look almost huggable quickly harden in a few days. As many as 30,000 sharp, barbed quills protect this living pincushion from hungry predators.

GALÁPAGOS SEA LION

Sea lion pups are born with longer hair called lanugo, which helps them keep warm until they develop blubber, or fat. Once this pup is a couple of months old, it can swim. By the time it's two years old, it will be ready to claim its reputation as one of the fastest mammals in the ocean, zipping through the water at bursts of up to 25 miles an hour.

SNOW LEOPARDS

Nice coat! Snow leopards live in some of the coldest parts of Asia, where they need the fluffiest, fuzziest fur to keep warm. These rare cats have large, fur-covered paws that act like snowshoes so they don't sink into deep snow. Snow leopards also beat the chill by sleeping with their tails wrapped around them like a blanket.

JAPANESE MACAQUE

These pink-faced snow monkeys are native to Japan. During the freezing winter, some groups treat themselves to a resort-style dip in natural hot springs. Others wash their food in salt water to give it a little extra flavor.

© KLEIN-HURBERT / KIMBALL STOCK (MICE); RON NIEBRUGGE / ALAMY (PORCUPINE); SUZI ESZTERHAS / MINDEN PICTURES (SEA LION AND SNOW LEOPARDS); KLEIN AND HUBERT / MINDEN PICTURES (MACAQUE); MARK RAYCROFT / MINDEN PICTURES (BLACK BEAR)

BLACK BEAR

These cautious creatures weigh about as much as a hockey puck when they're born and even purr as they nurse from their mother. After they stop drinking milk, North America's black bears munch on almost anything—insects, nuts, berries, and even grass.

SCIENCE BLOOPERS

Three Nat Geo Explorers reveal their silliest mistakes.

BY ALLYSON SHAW

SPERM WHALES NEAR SRI LANKA DO THEIR BUSINESS IN THE OCEAN.

goofometer

WHOSE POO?

THE SCIENTIST
Mauricio Cantor

COOL JOB
Behavioral ecologist

THE LOCATION
Galápagos Islands, Ecuador

"We were on a boat following sperm whales and scooping their poop from the ocean's surface. Back at the lab, I could study the stuff to learn more about the whales' social lives. So I placed each poo sample into a vial labeled with the animal's name and social group. Then I put the tubes into a container of liquid nitrogen—it's minus 320°F and instantly freezes the poop, which keeps it fresh.

"Back at the lab, I opened the container—and all the labels had fallen off the vials! I didn't know which poop sample belonged to which whale. I'd ordered the wrong stickers, which fell off in the super-cold temperature. I was not the most popular person at the lab that day—but instead the most '*poop*-ular.'

"This is how science works: You fail a lot, and you learn from it. Luckily, I could use other data I had collected on that trip for my research. And I definitely learned not to buy the wrong labels!"

TONY WU / NATURE PICTURE LIBRARY (WHALES); CLARISSA TEIXEIR (CANTOR); MAURICIO CANTOR (VIAL)

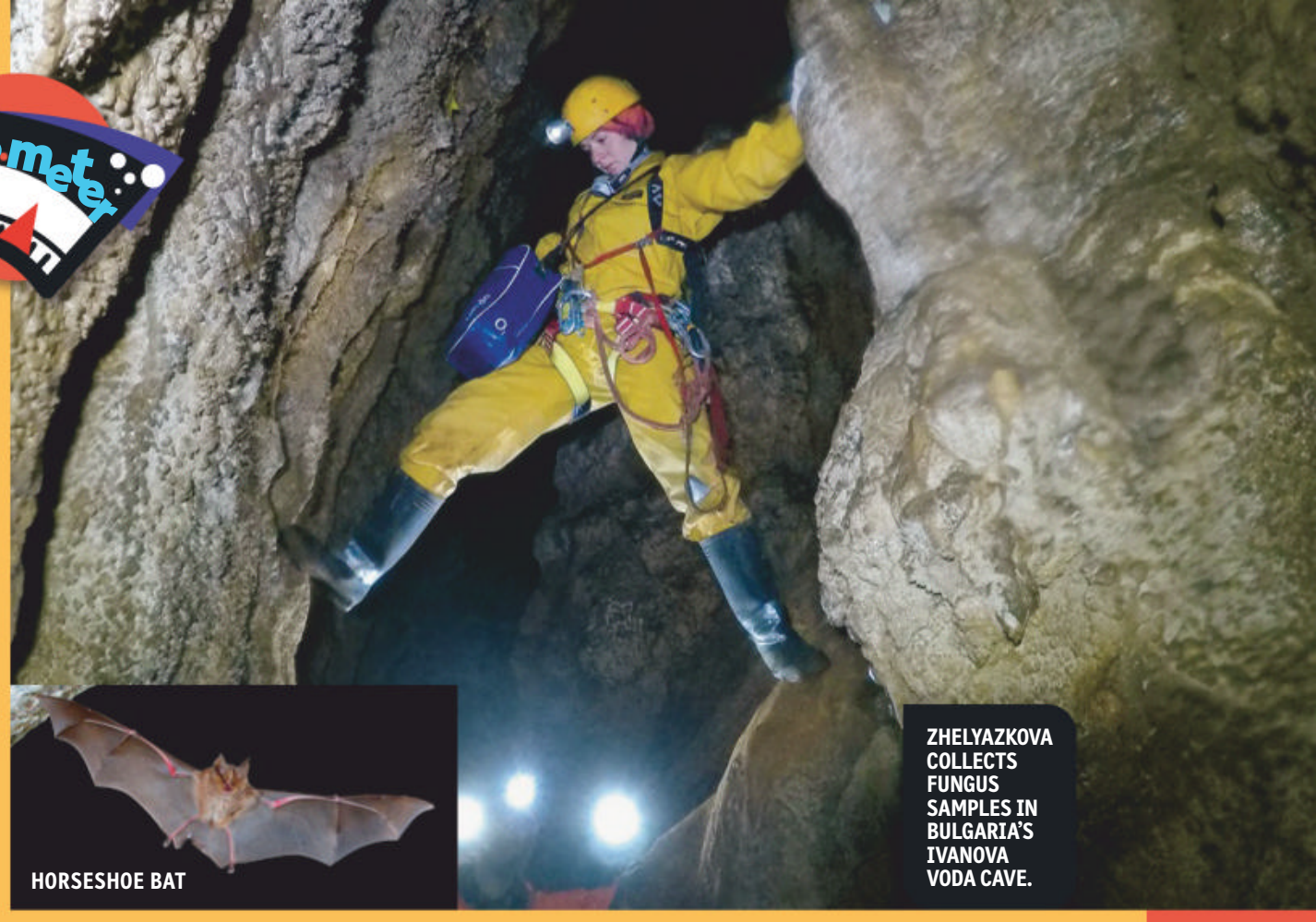
CAVE CONFUSION

goofometer

THE SCIENTIST
Violeta Zhelyazkova

COOL JOB
Biologist and mycologist *(a fungi scientist)*

THE LOCATION
Raychova Dupka cave, Bulgaria



ZHELYAZKOVA COLLECTS FUNGUS SAMPLES IN BULGARIA'S IVANOVA VODA CAVE.

HORSESHOE BAT

"My research partner and I entered one of the deepest caves in Bulgaria to study the horseshoe bats that live inside. Many people had explored this cave before, so I thought that we'd see a sign telling visitors when to turn back before the cave became too small for a person to pass through.

"We traveled over a thousand feet beneath the Earth's surface, swabbing the bats' noses and cave walls with cotton to gather samples along the way. (We were studying if a fungus might be growing on these animals.) As we went on, the cave got smaller and smaller until ... I got stuck! I was so confused: Hadn't lots of other people been down here? I had no choice but to turn back.

"I wiggled backward while my teammate behind me laughed at my strange moves. Defeated, we headed toward the entrance. And *then* we spotted the sign!

"Although we'd gathered what we needed from the bats that day, we learned an important lesson about paying closer attention while doing science!"

FISHY FAIL

THE EXPLORER
Hannah Nordhaus

COOL JOB
Science journalist

THE LOCATION
Syr Darya river, Kazakhstan

goofometer

"We were searching for a fish that hadn't been seen in 50 years, a sturgeon called the Syr Darya shovelnose. Around midnight after the first day, I woke up to a strange feeling—hundreds of tiny ants were crawling on my neck and biting me!

"I brushed them off, but their bites left big, red welts. Then I saw where the ants were walking: straight from the front door to my bag, climbing over me and my teammates to get there.

NORDHAUS'S TEAM FOUND FISH LIKE THIS ASP—BUT NO SYR DARYA STURGEON.

NORDHAUS TAKES NOTES AS SCIENTISTS SET UP NETS FOR THE FISH.

"Turns out, a container of sugary powder that I mix with water to keep me hydrated broke in my bag on my flight to the site. I didn't know it—but the ants did!

"Even after I cleaned up the mess, the ants returned each night. I learned to pack more carefully and always check my bag upon arrival.

"My teammates spent two weeks dredging sections of the river with nets, finding 10 different species of fish. But they didn't find any Syr Darya sturgeon and are planning a return trip to search again for this ghost fish. So I also learned from them to never give up."

SEE SILLY PHOTOS OF ANIMAL BLOOPERS!
natgeokids.com/june-july

KRUM SIRAKOV (CAVE); JORDAN DAMYANOV (ZHELYAZKOVA PROFILE); IMAGEBROKER / ALAMY (BAT); CASIE ZALUD (NORDHAUS PROFILE); DAVID GUTTENFELDER, NATIONAL GEOGRAPHIC (AT RIVER, FISH)

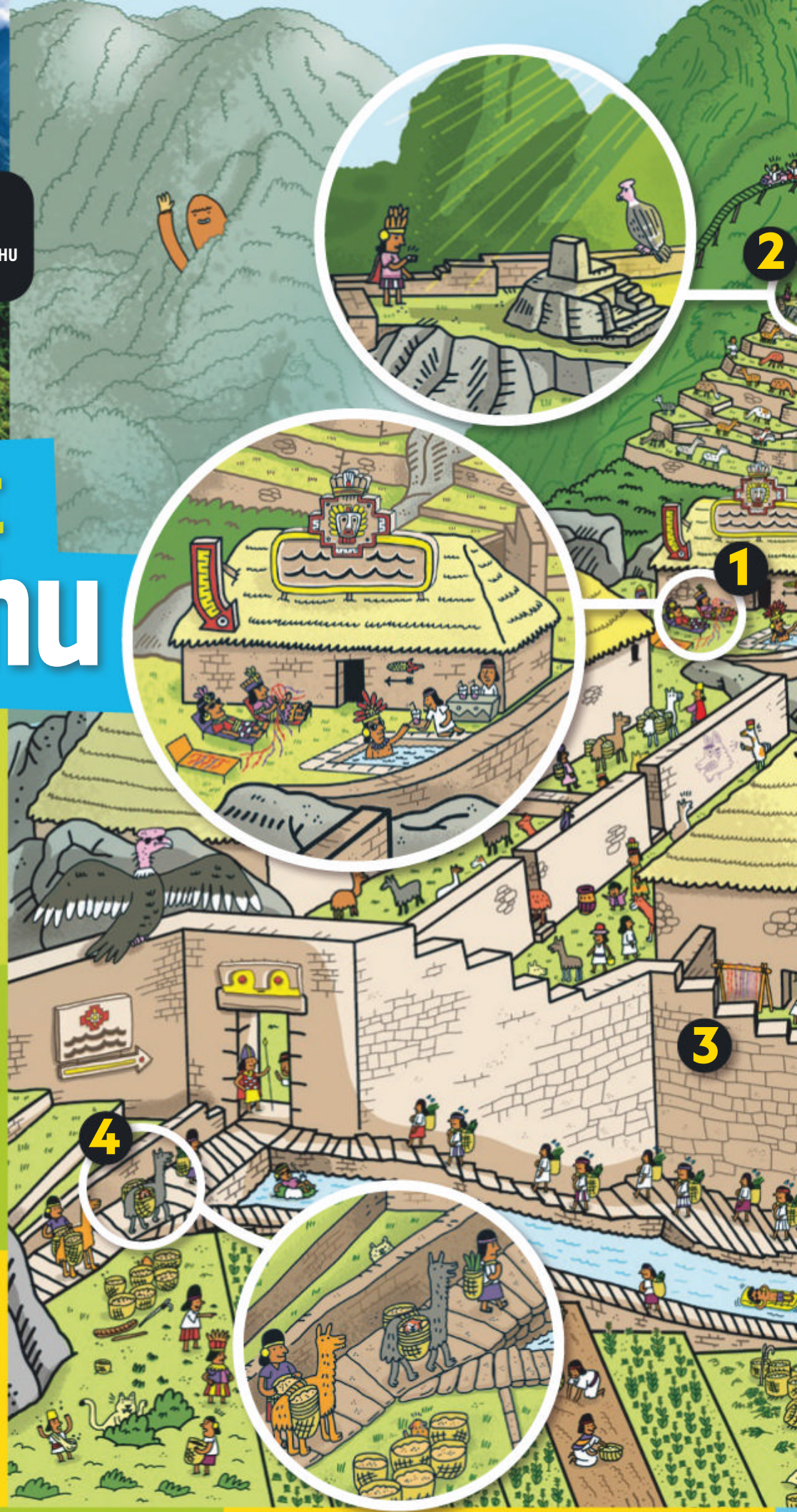
THIS PHOTO SHOWS THE RUINS OF MACHU PICCHU TODAY.

Cool Things About Machu Picchu

BY ALLYSON SHAW | ART BY CLAYTON HANMER

The Inca Empire was the most powerful of the day, ruling western South America between 1400 and 1533. And the Inca leaders sometimes needed vacations!

That's why the Inca built Machu Picchu in what's now Peru. All that's left today are ruins, but about 500 years ago, it was a bustling royal residence. Peek into the past to discover the secrets of this awesome spot.



1 ROYAL RELAXATION

The royal family lived mostly in the mountainous capital city, Cusco. But during the winter, they could move down to the warmer Machu Picchu. **Emperor Pachacuti Inca Yupanqui** (pah-chah-KOO-tee EENG-kah YOO-pahn-kee) likely ordered construction of the retreat around 1450. There, the royals could feast and entertain guests. The other 750 residents served the rulers and maintained the city.

2 SUNCATCHER

The Inca worshipped a sun god named Inti (in-TEE) and called themselves the people of the sun. No wonder they built a **six-foot-tall stone pillar** on Machu Picchu's highest point; some archaeologists think it worked as a sort of sundial. Explorers named it Intihuatana (in-TEE-wah-tah-nah), meaning "hitching post of the sun."

3 PERFECT FIT

Earthquakes are common in Peru, so Inca builders designed Machu Picchu to withstand these tremors. They **cut the stones to fit together,** and they didn't use any material (like cement) to bind them. This way, when the ground shook, the stones could bounce around and then settle back into place.

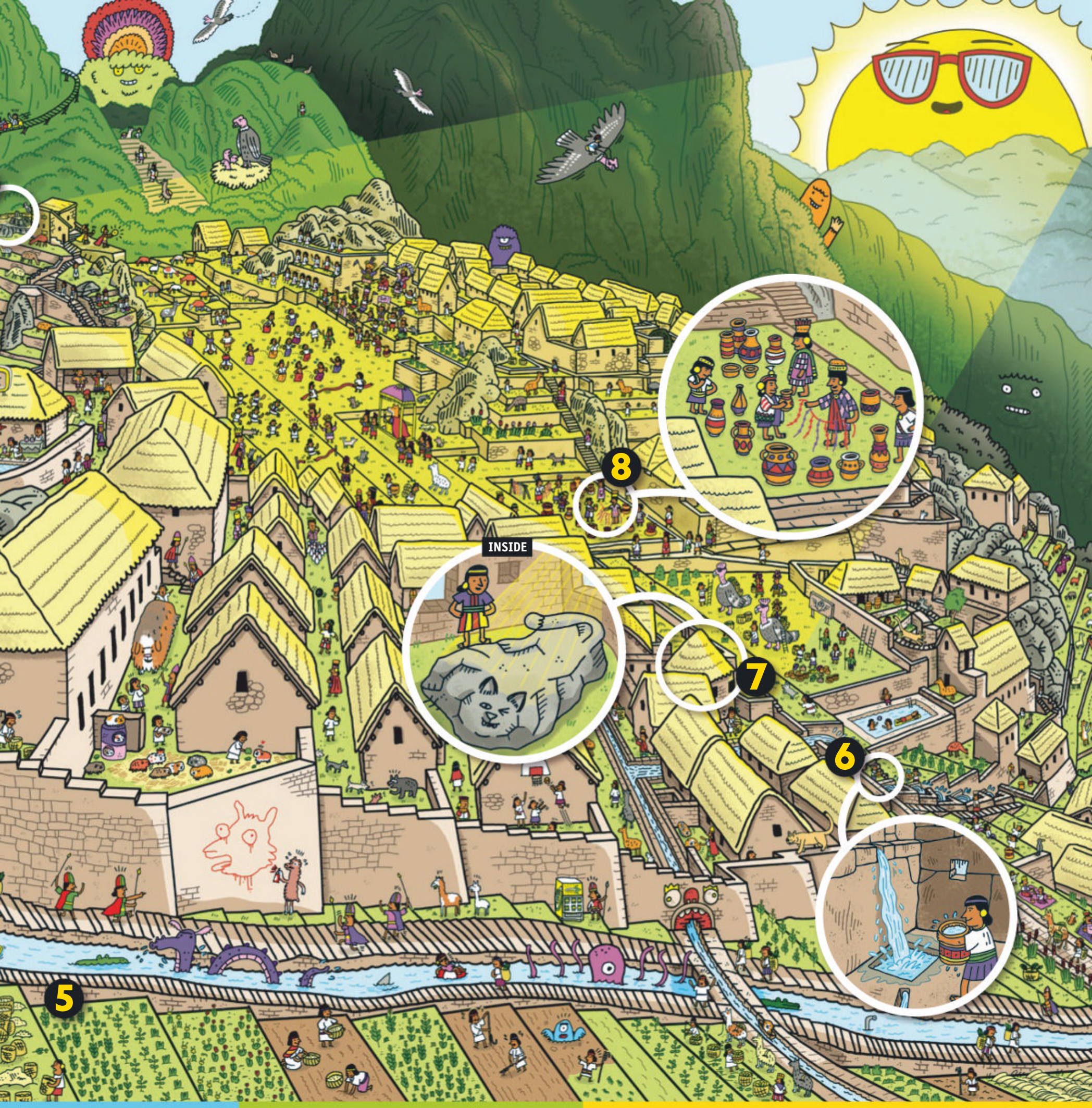
4 LLAMA DRAMA

How did Inca builders haul materials to Machu Picchu without wheels, horses, or oxen? **Llamas helped,** but these animals only carry about a hundred pounds before refusing to move. (An ox can pull over *a thousand* pounds.) So Inca workers carried some material on their own backs and used sleds to push or pull heavy stones.

5 GARDEN PARTY

To prevent a big landslide from destroying Machu Picchu, the Inca built more than **600 terraces**—flat areas made in the hillside. Filled with stones, gravel, and sand, each terrace stabilized the mountain slopes and slowly absorbed rainwater. This way, rain and mud didn't rush down the mountain and wear down anything in its path. A top layer of soil on each terrace provided a place to grow food like potatoes, corn, and beans.

GO GA / GETTY IMAGES (PHOTO); ART REVIEWED BY DENISE POZZI-ESCOT AND JOHAN REINHARD



6 SPLASHDOWN

Hand-carved canals brought fresh water from nearby springs to Machu Picchu. Then the water splashed down **16 fountains**. The system, which still works today, could carry up to 80 gallons of water each minute.

7 TEMPLE OF THE SUN

On the longest and shortest days of the year, the morning sunshine fell on what some experts think was a puma-shaped stone in the center of this temple. Experts think this **curved-wall structure** was another place for people to worship the sun. And the puma? These animals were sacred to the Inca; Emperor Pachacuti even wore a puma skin when going to battle.

8 CODED LANGUAGE

The Inca didn't have a written language and instead used **knotted cords called quipu** (KEE-poo) to send messages and keep records. Experts think the style of the knot and the color of the string contained information. Researchers are now using computers to try to untangle these long-lost codes.

DISCOVER MORE AMAZING FACTS ABOUT THE INCA!
natgeokids.com/june-july

FUN STUFF

GAMES, LAUGHS, AND LOTS TO DO!

What's Your HAMSTER IQ?

How much do you know about these small but mighty animals? Take this quiz to find out!

In the book series *Zeus the Mighty*, golden hamster Zeus believes he's a Greek god born to rule. Real-life hamsters rule, too—as pets, at least! Answer these questions from the *Zeus the Mighty Activity Book* to see how much you know about these awesome animals. ANSWERS ON PAGE 35

1 Where did the name "hamster" probably come from?

A. The animal was discovered by a person named Hamm.

B. People thought the animals looked like little hams.

C. It comes from a word meaning "tiny."

D. It comes from a word meaning "to hoard."

2 Which of these is *not* a type of hamster?

A. roly poly

B. teddy bear

C. dwarf

D. Chinese

3 True or false?

A golden hamster mom will sometimes keep her babies in her cheeks.

4

Golden hamsters are the most common type of pet hamster. How big do they get?

A. 2 inches long
B. 4 inches long
C. 6 inches long
D. 8 inches long

5

About how long does a golden hamster live?

A. 1 year
B. 2 to 3 years
C. 8 to 10 years
D. Like Greek gods, they're immortal.

6

Which of these would *not* make a good snack for a hamster?

A. carrots
B. chocolate
C. bananas
D. strawberries

7

True or false?

A hamster's teeth never stop growing.

8

True or false?

Hamsters are active mostly during the daytime.

9

True or false?

Hamsters have great eyesight.

10

True or false?

Hamsters don't need a lot of exercise.

11

What do hamsters use their paws for?

A. gripping
B. digging
C. running
D. all of the above

12

Where do wild hamsters like to sleep?

A. on mountain peaks
B. out in the open
C. in underground burrows
D. inside caves

SLEEPY PET HAMSTER

Find out what antics Zeus and his pet pals are up to in the latest book, *Zeus the Mighty: The Voyage on the Oddest Sea!* zeusthemighty.com

DORE ART / SHUTTERSTOCK (HAMSTER ON WHEEL); INUTA PHOTOGRAPHY / SHUTTERSTOCK (HAMSTER IN CUP); SUBBOTINA ANNA / SHUTTERSTOCK (MAIN IMAGE, 4); LEPAS2004 / GETTY IMAGES (6); PUNYAPHAT LARPSOMBOON / SHUTTERSTOCK (12)

WHAT IN THE WORLD?

FUN IN THE SUN

These photographs show close-up views of things commonly found at the beach. Unscramble the letters to identify what's in each picture.

ANSWERS ON PAGE 35

VEWA

_____

MSIW RNSUKT

_____

HRIAC

_____

SHLASESLE

_____

ABRC

_____

LUGL

_____

BILSOTAA

_____

ASGSLUESNS

_____

ILFP-POFL

_____

TOP ROW (LEFT TO RIGHT): © BOB BARBOUR / MINDEN PICTURES; © PEPEBOUZA / ALAMY; JAMIE GRILL / AURORA PHOTOS. MIDDLE ROW (LEFT TO RIGHT): VALERY EVLAKHOV / SHUTTERSTOCK; © DON HADDEN / ARDEA; © ROSS HODDINOTT / NATURE PICTURE LIBRARY. BOTTOM ROW (LEFT TO RIGHT): CHRISTOPHE LAUNAY / AURORA OPEN / AURORA PHOTOS; © METTA FOTO / ALAMY; © BEACHSHOOTER / ALAMY.

CRITTER CHAT

If animals used social media, what would they say? Follow this *T. rex's* day as it updates its feed.
BY ALLYSON SHAW

TYRANNOSAURUS REX

SCREEN NAME: DinoQueen
LIVES IN: Western North America, about 68 million years ago
FRIENDS

TRICERATOPS — TripleThreat

ANKYLOSAURUS — TailTrouble

EDMONTOSAURUS — ShovelMuzzle

START

9 a.m.

DinoQueen: Teeth? Sharp. Feet? Stompy. Nose? Sniff-tastic. Stomach? Hungry. You better hide—I'm on the prowl.

TailTrouble: Don't smell me! I'll smack you with my heavy tail!

ShovelMuzzle: Sending out the honk alert to my herd: **@DinoQueen** is hunting. Run! #SheIsScaryButSlow #TRexRace

TripleThreat: Don't even think about tangling with my three horns, **@DinoQueen.** I'm no pushover. #16,000Pounds

10 a.m.

DinoQueen: I sniffed out some leftovers, aka dead meat. Now I get to play with my food. #TossAndCatch

TailTrouble: Glad you found something, er ... tasty? #Plant-Eater

TripleThreat: Whew! Now I can use my horns to impress my mate—not to fight **@DinoQueen.** #PeaceAndLove

ShovelMuzzle: And my herd and I can go back to relaxing in the swamp. #ChillingOut

3 p.m.

DinoQueen: I think my hatchling should win #CutestBabyDino.

ShovelMuzzle: Whoa, **@DinoQueen** has a soft side! My tiny tots are pretty cute, too. They're just 1/20 of my length—and supersweet.

TripleThreat: *T. rex* chicks might be cute, but the teenagers are terrors! I had to battle a few last year.

TailTrouble: And one day they'll be 40 feet long with a bite that can crush bones. #NotThatCute

DinoQueen: Hey, I'm one of the fiercest predators of all time—maybe you should just agree with me.

CHECK OUT OUR DINOSAUR HUB!
natgeokids.com/dinomania

HERSCHEL HOFFMEYER / SHUTTERSTOCK (*T. REX* LARGE IMAGE); FRANCO TEMPESTA (*T. REX* PROFILE, ALL; *EDMONTOSAURUS* PROFILE, ALL; *T. REX* TOSSING MEAT); VLADIMIR BOLOKH / SHUTTERSTOCK (*TRICERATOPS* PROFILE, ALL); ROGER HARRIS / SCIENCE SOURCE (*ANKYLOSAURUS* PROFILE, ALL); DANIEL ESKRIDGE / ALAMY (*ANKYLOSAURUS* TAIL); MARK GARLICK / SCIENCE PHOTO LIBRARY / GETTY IMAGES (*EDMONTOSAURUS* IN SWAMP); R. PETERSON / © AMNH (*T. REX* HATCHLING); ANTHONY HUTCHINGS, © FRIENDS OF NC MUSEUM OF NATURAL SCIENCES (*TRICERATOPS* AND *T. REX* BATTLE); TURGAY MALIKLI / SHUTTERSTOCK (EMOJIS, ALL)

Whatcha Think?

Check out how *Nat Geo Kids* readers responded to this poll!

Which shark is your fave?

WHALE SHARK 23%

GREAT WHITE SHARK 30%

LEMON SHARK 13%

GREAT HAMMERHEAD SHARK 21%

TIGER SHARK 13%

PETE OXFORD / NPL / MINDEN PICTURES (WHALE); MIKE PARRY / MINDEN PICTURES (GREAT WHITE); SHANE GROSS / NPL / MINDEN PICTURES (LEMON); JIM ABERNETHY / NATIONAL GEOGRAPHIC IMAGE COLLECTION (TIGER); ALEX MUSTARD / NPL / MINDEN PICTURES (GREAT HAMAMERHEAD)

FUNNY FILL-IN

PLAY MORE FUNNY FILL-IN!
natgeokids.com/ffi

FOURTH OF JULY

BY JILL FANSLAU

Ask a friend to give you words to fill in the blanks in this story without showing it to him or her. Then read out loud for a laugh.

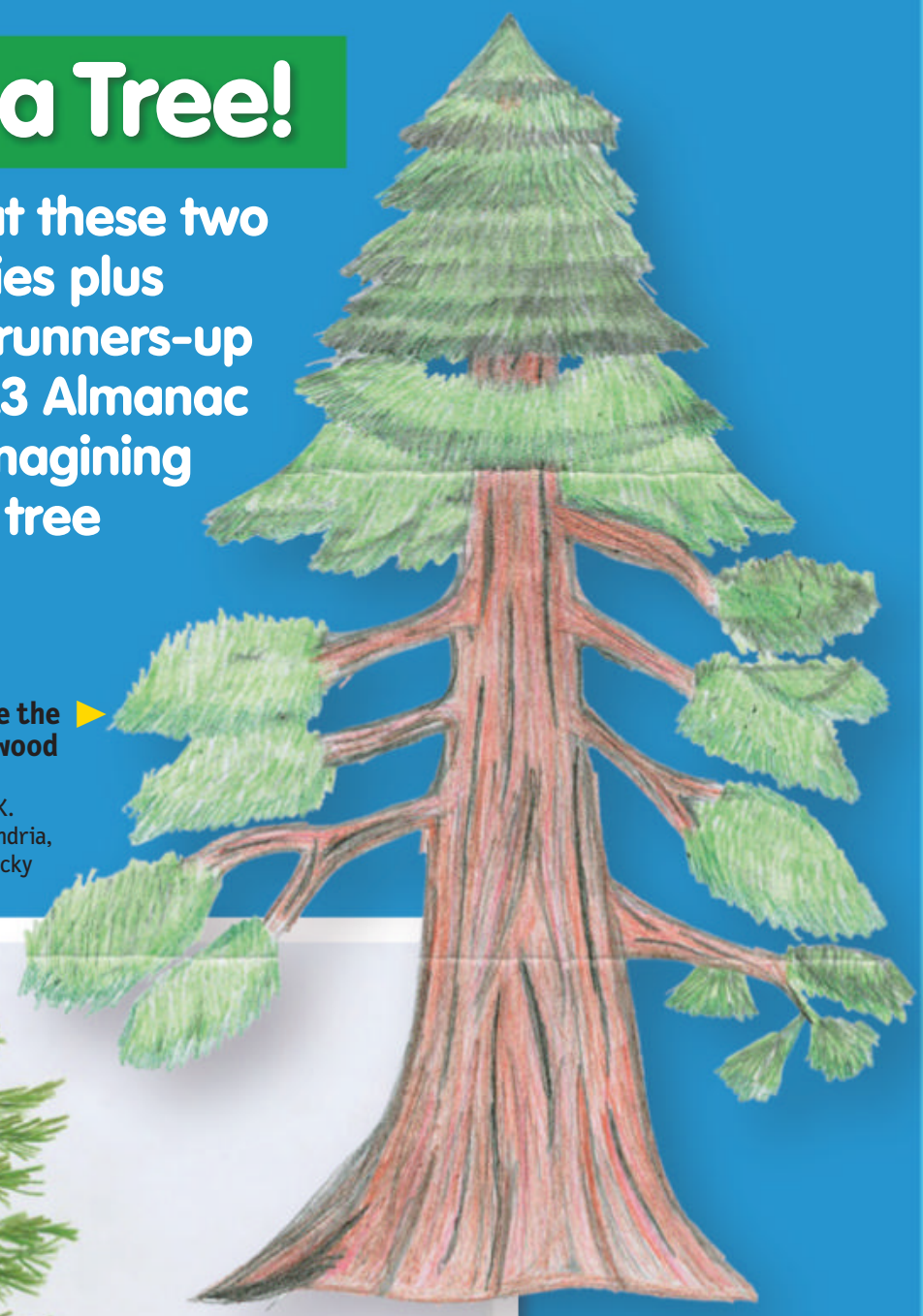
This year my parents invited all of our _____ (adjective) relatives and friends over for the Fourth of July. We grilled outside on the _____ (noun) and even rented an inflatable _____ (noun) for the little kids to jump up and down on. You should have seen the _____ (adjective) outfits my relatives wore. Everyone was decked out in _____ (color), _____ (color), and blue. Grandma wore a(n) _____ (article of clothing) shaped like a bald _____ (type of bird), and _____ (relative's name) dressed up like Uncle Sam. But the funniest part of the day was when _____ (different relative's name) pretended to be Founding Father _____ (male celebrity). (S)he wore a(n) _____ (color) wig and everything! I laughed so hard that I almost fell off the _____ (noun). As the sun went down, fireworks started _____ (verb ending in -ing) in the night sky. That's when my dad decided to _____ (adverb ending in -ly) sing "_____ (song title)." All of my relatives _____ (past-tense verb) for the door faster than you can say _____ (long word). I guess this Independence Day really made history.

DAN SIPPLE

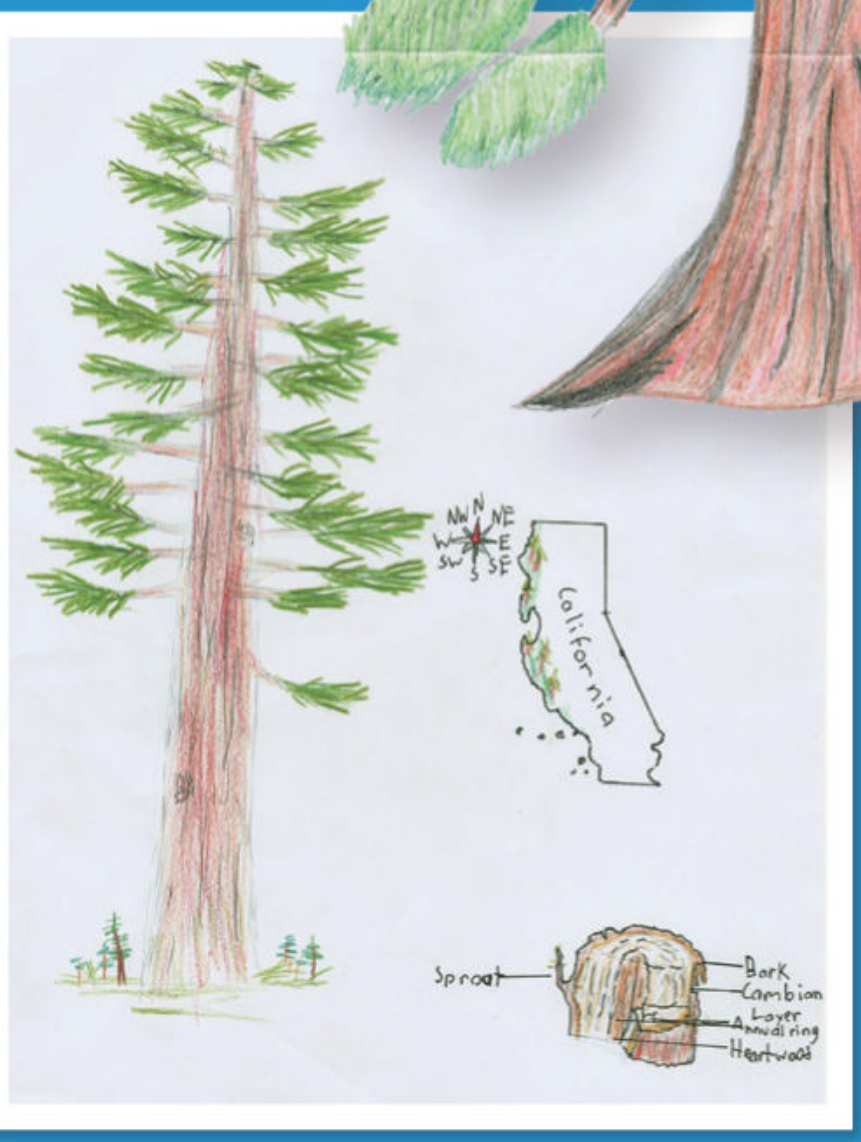
ART ZONE

Me as a Tree!

Take a look at these two winning entries plus some of the runners-up from the 2023 Almanac Challenge: imagining what kind of tree you'd be.



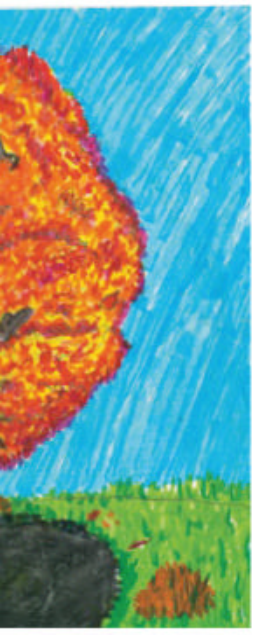
Rosie the Redwood Tree
Abby K.
Alexandria, Kentucky



Coastal Redwood
Adam B.
Winnipeg, Canada

Copac the Tree
Catalina N.
Hamilton, Virginia

Ash Tree
Sydney J.
Neosho, Missouri



Sugar Maple
Caitlin O.
Mount Pleasant, South Carolina

Giant Redwood Tree
Victor Z.
Cupertino, California

An Aspen Tree Like Me!
Kyna M.
Los Gatos, California

Rainbow Eucalyptus Tree
Zhiyue H.
Marietta, Georgia

ʻŌhiʻa Tree
Sophie W.
Honolulu, Hawaii

ALMANAC CHALLENGE:

Draw a social profile for an elephant.

Send us what you think a social media profile would look like for an elephant, including a few posts raising awareness for their species. You can print a template from our website or create your own. Your art could be featured in the *Nat Geo Kids Almanac 2025*.

Grab a parent and go online for official rules and submission form.

natgeokids.com/almanac

PARENTS! GO ONLINE FOR A CHANCE TO WIN THIS BOOK FOR YOUR KID. natgeokids.com/giveaways

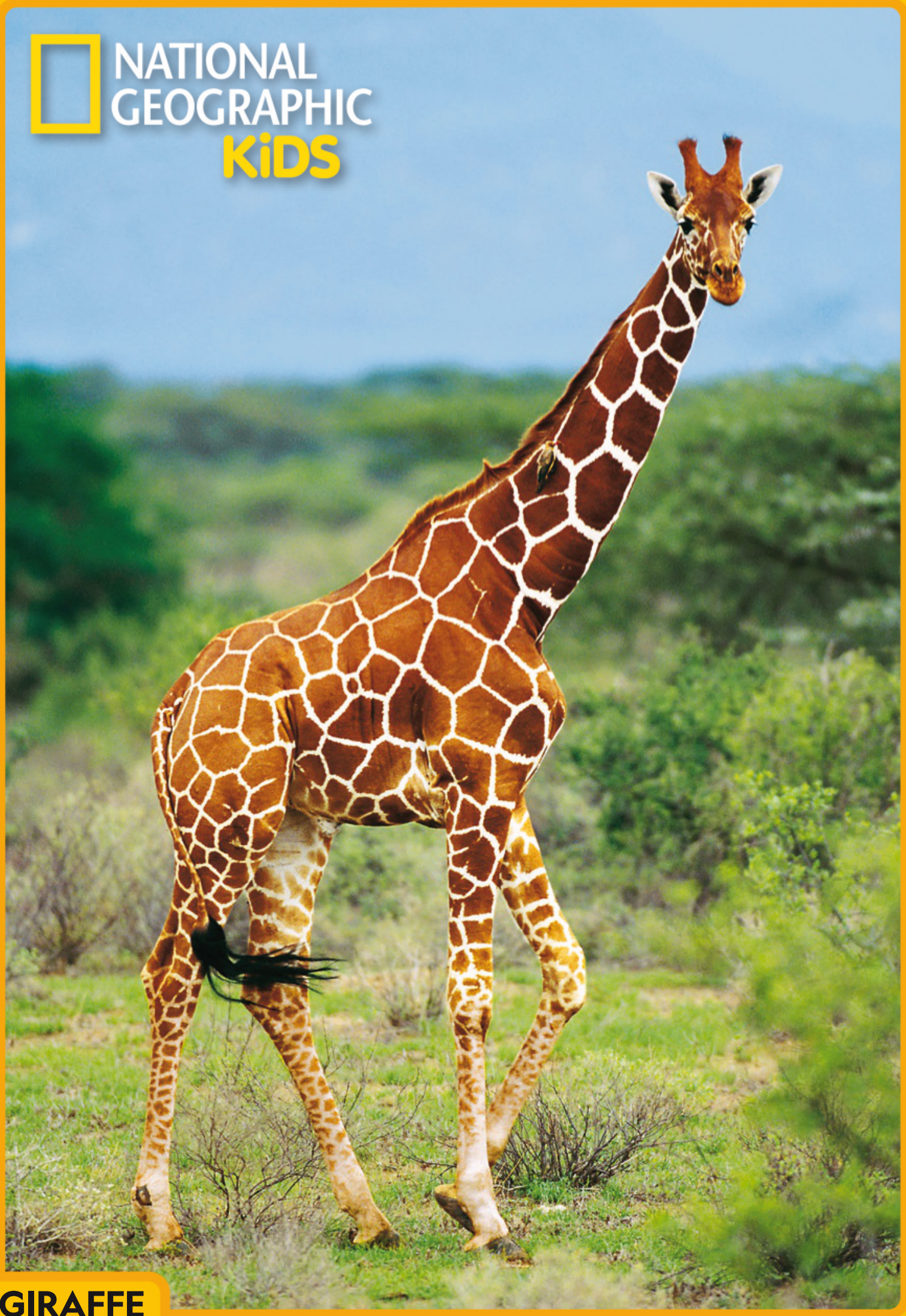
NO PURCHASE NECESSARY. Begins on 6/7/23 at 8 a.m. ET and ends on 6/14/23 at 11:59 p.m. ET or until 10 eligible entrants are verified, whichever is earlier. First come, first served. Open to 50 U.S./D.C.; 18+; with children ages 6-14. SUBMISSIONS MUST BE EMAILED BY YOUR PARENT/LEGAL GUARDIAN. Void where prohibited. Sponsor: National Geographic Partners, LLC, 1145 17th St., NW, Washington, DC 20036. Rules/odds: https://natgeokids.com/giveaways

Answers

"What's Your Hamster IQ?" (pages 28-29):
1. D. "Hamster" likely comes from a German word meaning "to hoard" because of the way the animals stuff food into their cheeks. **2.** A. True. If she thinks her babies are in danger, a hamster mom will hide them in her cheek pouches. **4.** C; **5.** B; **6.** B. Never feed a hamster chocolate—it could become very sick. **7.** True. A hamster's teeth never stop growing; that's why they always need something to chew on, such as a wood block. **8.** False. Some hamsters are nocturnal, which means they're active at night. Others are crepuscular, which means they're busiest at dawn and dusk. **9.** False. Hamsters don't see well, but they do have a great sense of smell. **10.** False. Hamsters like to run and climb. Some hamsters can run for several hours each night. **11.** D; **12.** C.

"What in the World?" (page 30):
Top row: wave, swim trunks, chair.
Middle row: seashells, crab, gull.
Bottom row: sailboat, sunglasses, flip-flop.

Awesome Animals!



GIRAFFE

TEXT BY RUTH A MUSGRAVE

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GIRAFFE

A **If you built your own giraffe, 24 feet of it would be legs.**
TRUE: The legs are each six feet tall. Giraffes' long legs help them reach speeds up to 35 miles an hour.

B **A giraffe can barely swat a gnat with its tiny tail.**
FALSE: The tail can be more than six feet long, including the tuft at the end. It's the longest of any land mammal.

C **Its heart is so small, it's the Grinch of the animal kingdom.**
FALSE: A giraffe's heart is two feet long and weighs about 25 pounds.

D **You'd win a balloon-blowing contest with a giraffe.**
FALSE: A giraffe's lungs hold 11 times more air than your lungs.

E **A newborn giraffe weighs as much as two 10-year-old kids.**
TRUE: At birth, a baby giraffe weighs about 150 pounds.

CORBIS / PHOTOLIBRARY

NATIONAL GEOGRAPHIC KIDS

Awesome Animals!

CLARION ANGELFISH

CLARION ANGELFISH

A **A large Clarion angelfish is the same length as a dollar bill.**
FALSE: At almost eight inches, it's one dollar and two quarters long.

B **Its thin body helps it slip in and around the rocky reefs.**
TRUE: Clarion angelfish live in reef waters that are 10 to 100 feet deep.

C **This fish is so common, it's like the pigeon of the ocean.**
FALSE: Almost all Clarion angelfish live in a 31-square-mile area near Mexico's Revillagigedo Islands.

D **Clarion angelfish would love SpongeBob.**
TRUE: For dinner! These angelfish eat sponges, seagrasses, and algae.

E **A strong El Niño is its friend.**
FALSE: El Niño—the unusually warm surface waters that sometimes flow in parts of the Pacific Ocean—disrupts the nutrients in the angelfish's ocean home.

© FLIP NICKLIN / MINDEN PICTURES

NATIONAL GEOGRAPHIC KIDS

NATIONAL GEOGRAPHIC KIDS

LION

Awesome Animals!

LION

A **Females keep males away so cubs can eat.**
FALSE: The males prevent cubs from starving by shooing females away from the food.

B **If you're inviting a male lion over for burgers, you'll need 440 quarter-pounders.**
TRUE: He eats about one-fifth of his body weight—or 88 pounds—at each meal.

C **A cub doubles in size by the time it's two years old.**
FALSE: It is at least 21 times bigger. Newborns are between two to 4.5 pounds, and a two-year-old can be Walmost 100 pounds.

D **Lions in prides fight a lot.**
FALSE: Fighting is rare. When it does occur, fighting is usually over food.

E **If water is scarce, lions will eat fruit.**
TRUE: Lions survive droughts by eating *tsamma*, an African melon.

© RICHARD DU TOIT / MINDEN PICTURES

NATIONAL GEOGRAPHIC KIDS

Awesome Animals!

BLACK SWALLOWTAIL CATERPILLAR

BLACK SWALLOWTAIL CATERPILLAR

A The caterpillars' butterfly mother protects them.
FALSE: She lays hundreds of eggs and flies away. Caterpillars hatch a week later, able to survive on their own.

B It's a giant among caterpillars.
FALSE: A black swallowtail caterpillar grows to be about two inches long. Other species are nearly three times as long.

C It wouldn't eat your hot dog, but it might think about the pickles.
TRUE: These caterpillars eat dill, carrots, parsley, and Queen Anne's lace.

D You might advise a black swallowtail caterpillar to take a shower.
TRUE: It releases a bad odor if threatened.

E No way would you find any black swallowtails in someone's yard.
FALSE: People can attract black swallowtail butterflies to yards by planting carrot and fennel seeds. Females lay their eggs on these plants so the caterpillars that hatch have an instant food supply.

JASONONDREICKA / GETTY IMAGES

NATIONAL GEOGRAPHIC KIDS

NATIONAL GEOGRAPHIC KIDS

Awesome Animals!

HANUMAN LANGUR

HANUMAN LANGUR

A This langur is named after the Hindu monkey god, Hanuman.
TRUE: It's a sacred symbol of wisdom, strength, and devotion.

B Langurs can't survive living near people.
FALSE: Langurs thrive in villages, towns, markets, temples, and even cities with more than a million people.

C Wild cattle and deer are fascinated by dining langurs.
TRUE: The hungry hoofed animals wait near the monkeys and gobble up any food that they drop.

D These langurs have a hands-on approach to doctor's appointments.
TRUE: To try to revive a sick monkey, the langurs will shake it, sit on it, and even jump on its abdomen.

E A langur cautiously climbs down from a tall tree.
FALSE: It jumps down from a height of 40 feet. (That's a four-story drop.)

CYRIL RUOSO / MINDEN PICTURES

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Awesome Animals!

RING-NECKED PHEASANT

RING-NECKED PHEASANT

A **This bird has spread like a blanket.**
TRUE: Although native to Asia, people introduced it to North America and many other places. It's the most widespread game, or legally hunted, bird in the world.

B **Avoid having dinner with a ring-necked pheasant chick.**
TRUE: Chicks enjoy a high-protein diet of grasshoppers, crickets, ants, and other insects. Adults eat mostly grains, seeds, acorns, and fruits.

C **Old MacDonald isn't their friend.**
FALSE: These pheasants like marshes and grasslands, but farmers' fields provide food and hiding places.

D **Females sometimes lay eggs in other bird species' nests.**
TRUE: But chicks rarely hatch from them.

E **Pheasant predators might sound like a list of sports teams.**
TRUE: Falcons, coyotes, and eagles hunt them. But foxes, skunks, raccoons, dogs, cats, squirrels, and crows eat them, too.

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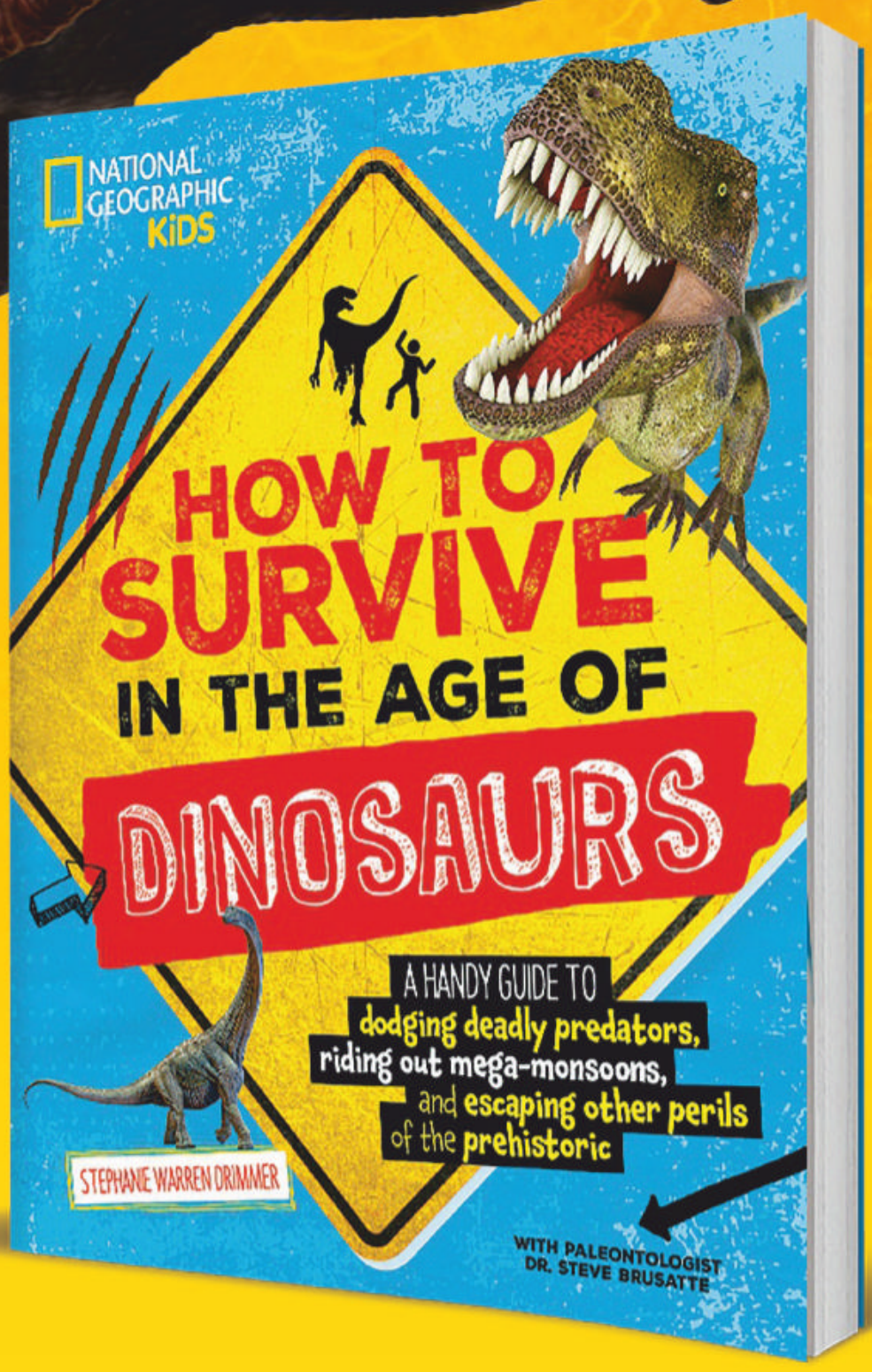
DINOSAURS ARE SOOOOO COOL...



BUT WHAT IF YOU HAD TO LIVE WITH THEM?

We've got you covered with all the tips and tricks you need to survive your blast to the past.

- WHAT TO DO IF YOU SEE AN ASTEROID COMING
- HOW TO TRACK A DINOSAUR
- CAN YOU EAT A DINO EGG?

Now you're ready to hang out with dinosaurs for a month as we celebrate

DinoMAYnia!
MAY 1–31

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