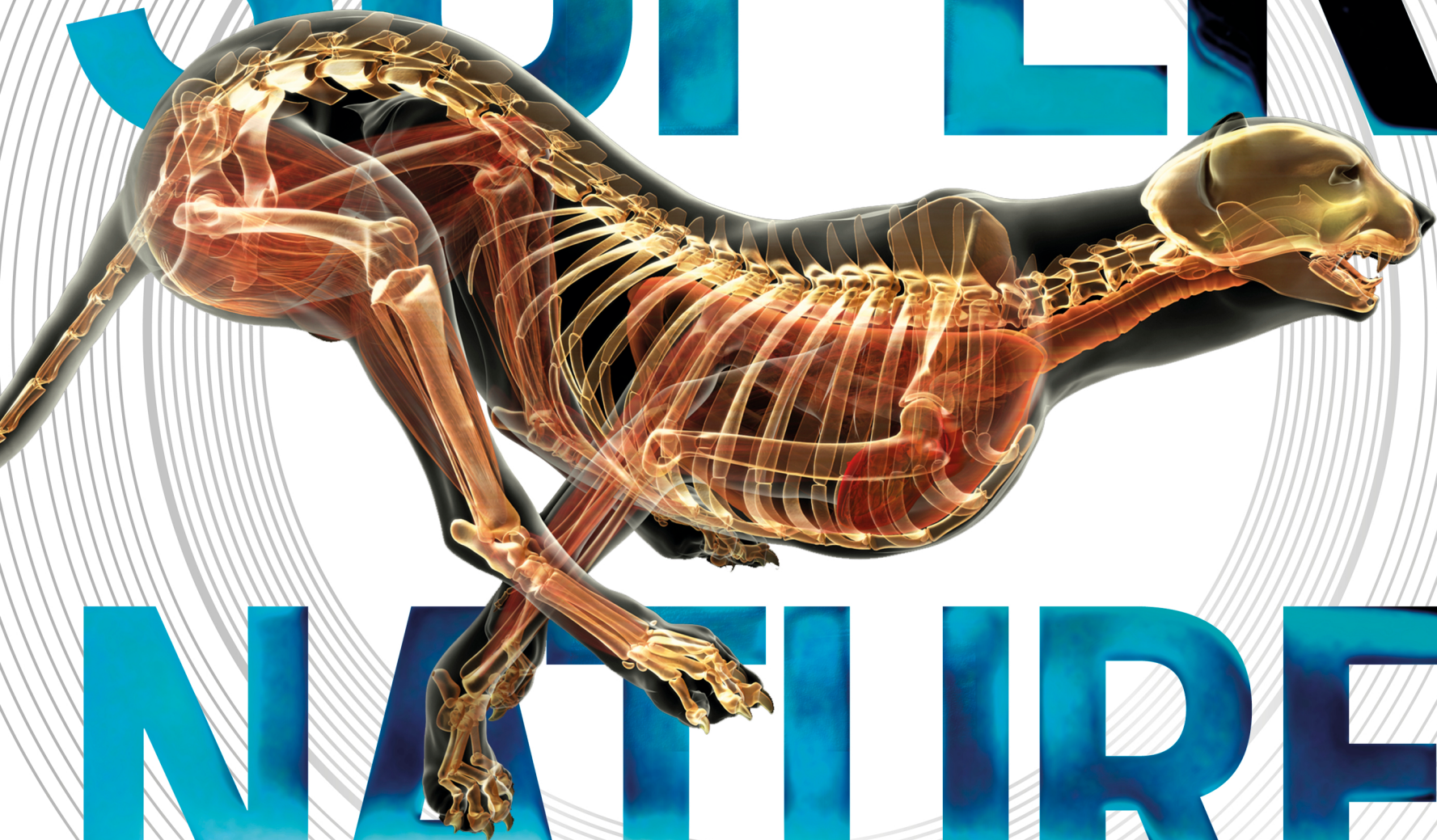




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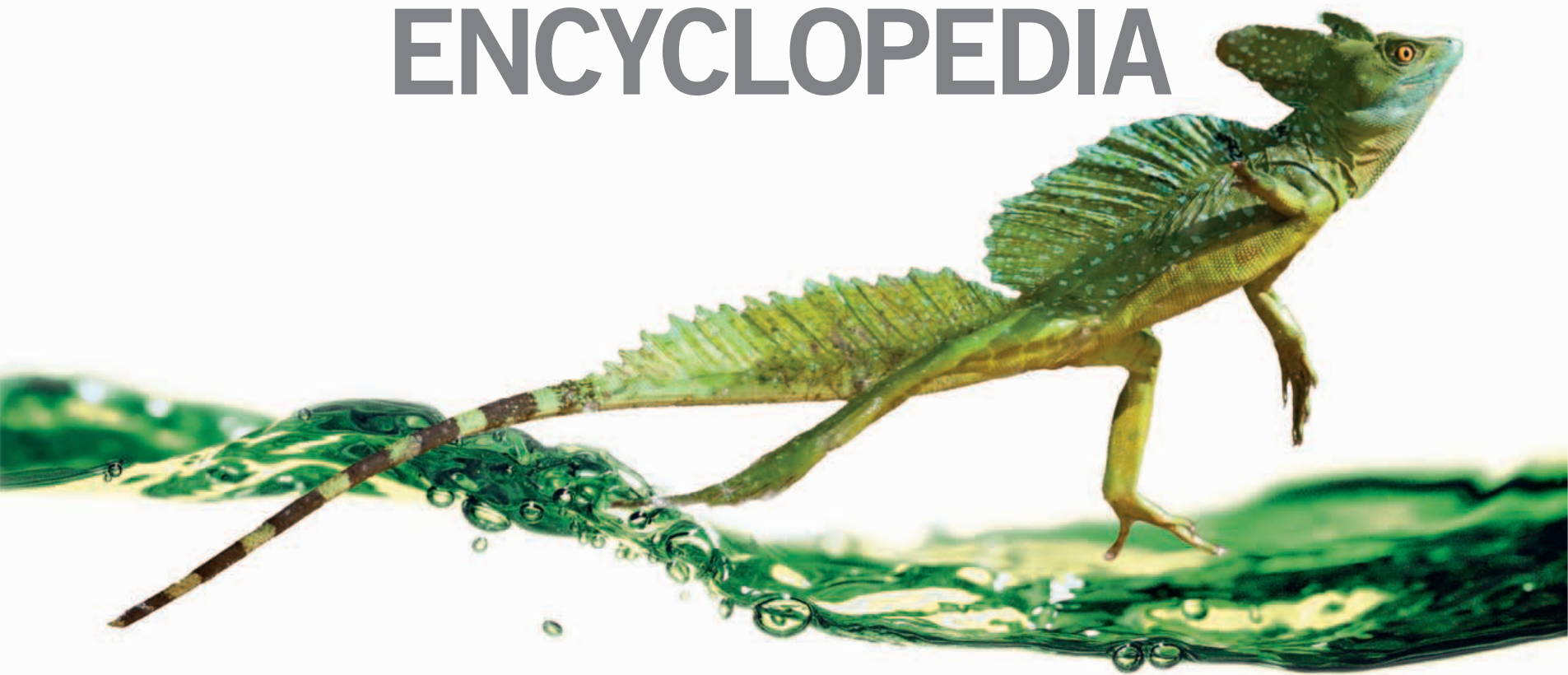
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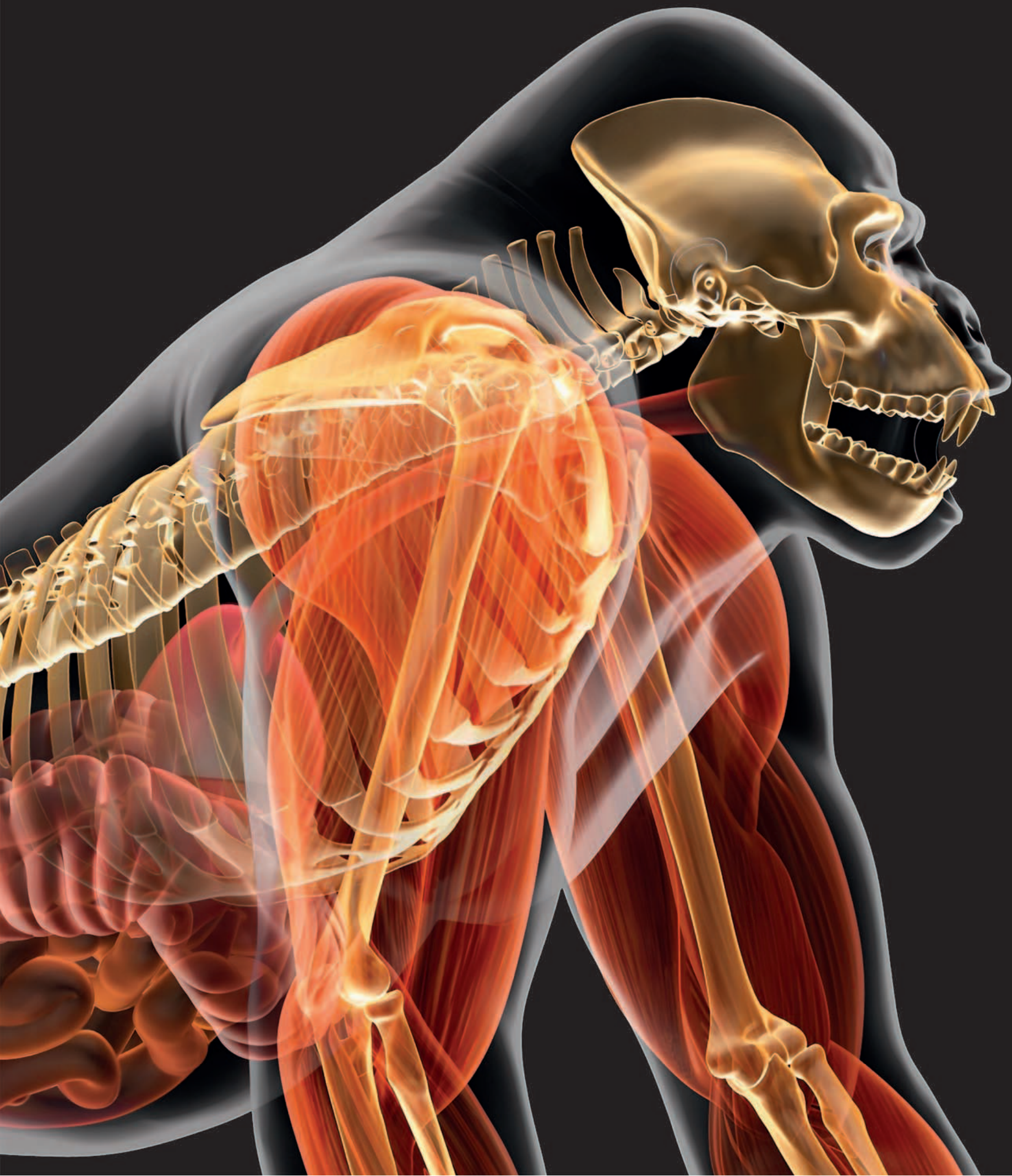


THE 100 MOST INCREDIBLE
CREATURES ON THE PLANET



SUPER NATURE ENCYCLOPEDIA







SMITHSONIAN



SUPER NATURE ENCYCLOPEDIA

THE **100** MOST INCREDIBLE
CREATURES ON THE PLANET

Derek Harvey

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Smithsonian Enterprises:
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First American Edition, 2012
Published in the United States by DK Publishing,
375 Hudson Street, New York, New York 10014
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12 13 14 15 10 9 8 7 6 5 4 3 2 1

001—183047—Sep/2012

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A catalog record for this book is available from the Library of Congress.

ISBN 978-0-7566-9793-8

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DK books are available at special discounts when purchased in bulk for sales promotions, premiums, fund-raising, or educational use. For details, contact: DK Publishing Special Markets, 375 Hudson Street, New York, New York 10014 or SpecialSales@dk.com.

Printed and bound in China by Leo Paper Products

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LIVING PLANET

Life began in Earth's oceans about 3.5 billion years ago. It has since spread, in a spectacular number of different forms, to every corner of the planet. Among the host of animals that inhabit land and sea there are some true superstars of nature that boast amazing abilities, incredible bodies, and fascinating lifestyles.



▶ SAVANNA

Tropical savanna grassland is hot all year round, but there are distinct dry and wet seasons. A few trees and shrubs offer some shade. On the African savanna, grazing animals such as wildebeest and zebra follow the rains in search of fresh grass, preyed on by lions and other carnivores.



▶ POLAR ICE

The polar regions—the Arctic Ocean around the North Pole, and Antarctica around the South Pole—are mostly covered by thick ice. Many polar animals use thick layers of fur, feathers, or fat to keep out the cold, while some fish have antifreeze in their blood.



▶ TROPICAL FOREST

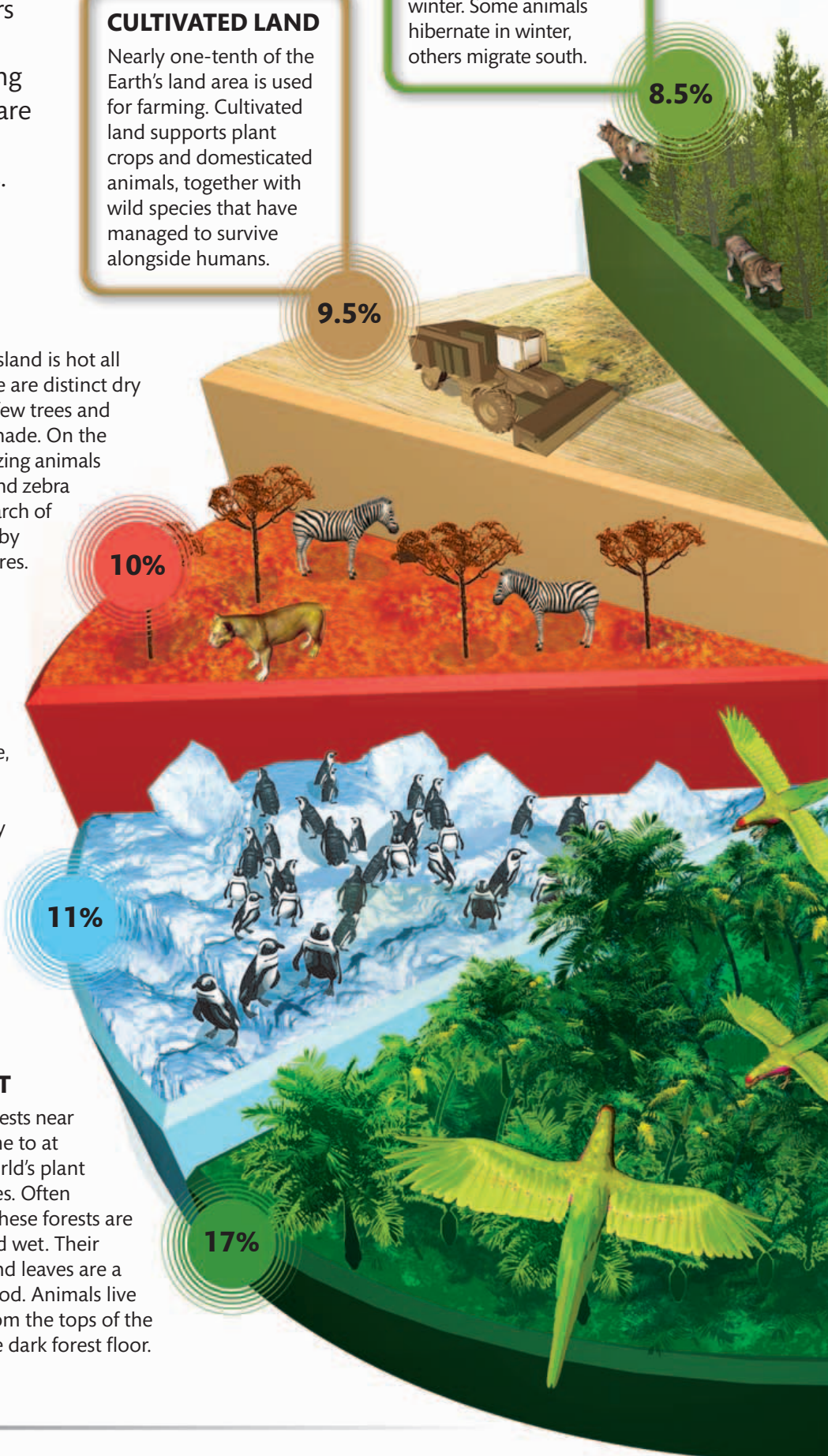
The lush, evergreen forests near the equator are home to at least half of the world's plant and animal species. Often called "jungles," these forests are always warm and wet. Their flowers, fruits, and leaves are a rich source of food. Animals live at every level, from the tops of the tallest trees to the dark forest floor.

CULTIVATED LAND

Nearly one-tenth of the Earth's land area is used for farming. Cultivated land supports plant crops and domesticated animals, together with wild species that have managed to survive alongside humans.

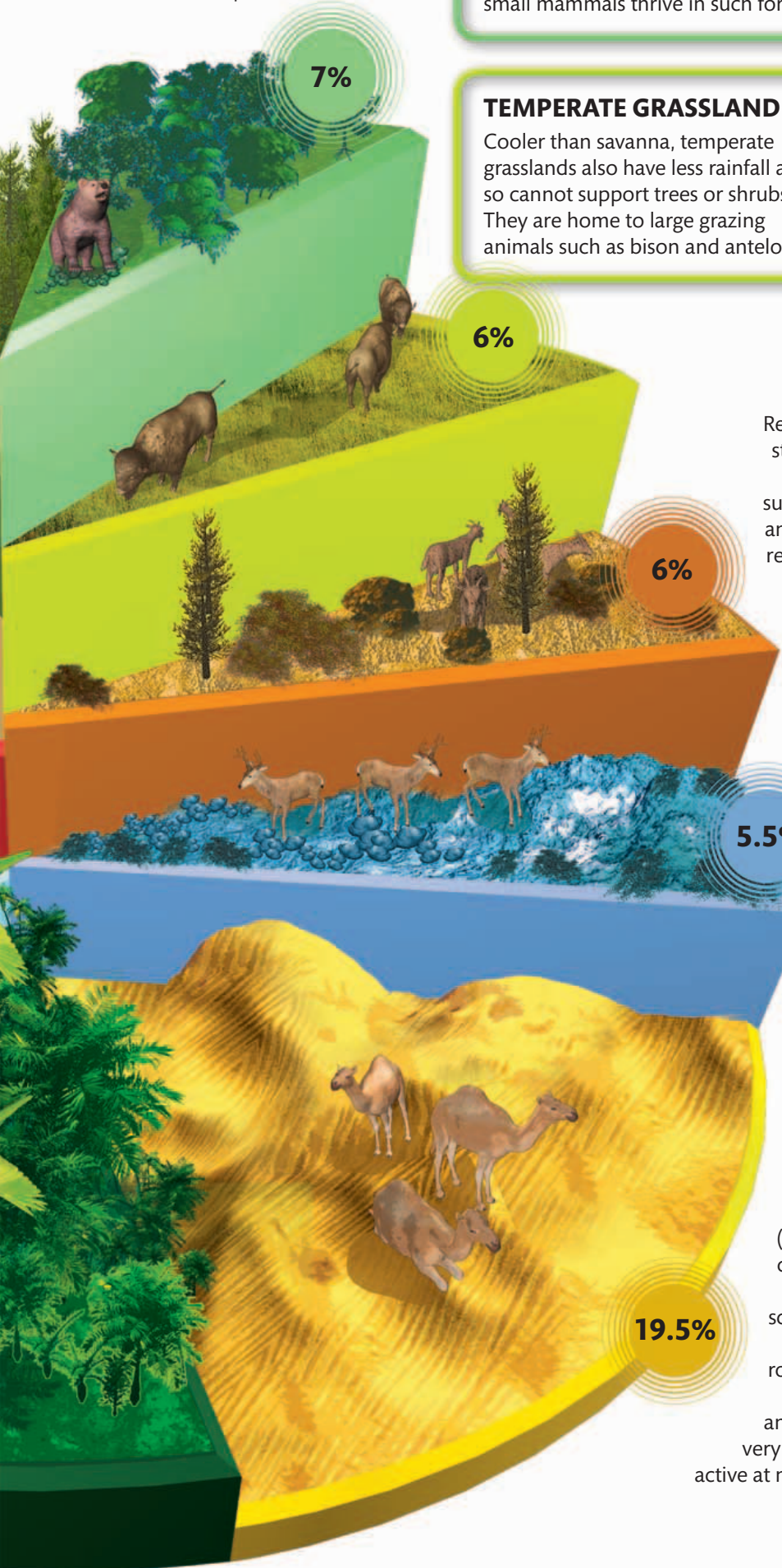
BOREAL FOREST

The dense forests of the far north are made up mainly of conifer trees. In the short summer there is plenty to eat, but food is scarce in the long, cold winter. Some animals hibernate in winter, others migrate south.



The world's biomes

Biologists divide the world into "biomes," regions with similar landscapes, climates, and wildlife. The figures below show how much of the Earth's land surface each biome occupies.



TEMPERATE FOREST

Broadleaved, deciduous trees flourish in mild (temperate) climates. Summers are warm, winters cool, and rain falls year-round. Birds, bears, deer, and small mammals thrive in such forests.

TEMPERATE GRASSLAND

Cooler than savanna, temperate grasslands also have less rainfall and so cannot support trees or shrubs. They are home to large grazing animals such as bison and antelope.

MEDITERRANEAN

Regions with a Mediterranean-style climate have short, wet, mild winters and long, dry summers. Shrubs, short trees, and cacti and other drought-resistant plants grow on their rugged landscapes. Animals include wild goats, lynx, jackals, boar, and vultures.

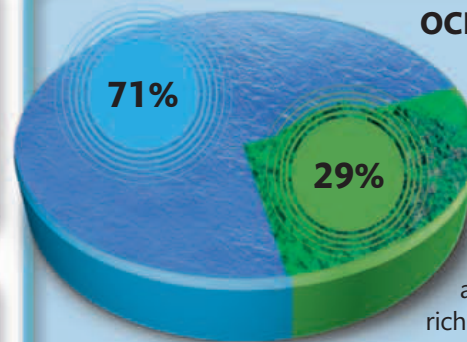
TUNDRA

The flat, treeless tundra lands surrounding the Arctic are free of ice, but below the surface layer the soil is always frozen. The tundra comes alive with flowers and insects in the summer, and many birds and mammals migrate there to feed and breed.

DESERT

Places with less than 10 in (25 cm) of rain a year are called deserts. They are usually hot—up to a scorching 120°F (50°C) by day—and either rocky or covered with shifting sand. Desert animals can survive on very little water. Many are active at night, when it is cooler.

OCEAN LIFE



Earth is a watery world, with vast oceans covering nearly three-quarters of its surface. Shallow seas near land, especially around coral reefs, are rich in wildlife. Animals that live out in the open ocean must be strong swimmers to move around in the currents. In the deepest ocean, up to 7 miles (11 km) below the surface, animals must cope with total darkness, very cold temperatures, and pressures that would crush a human.



ALL SHAPES AND SIZES

The world is bursting with animals. We know of more than 1.5 million different species of living animal, in all shapes and sizes imaginable. In fact, there are so many that a whole branch of biology—taxonomy—is devoted to classifying them into groups based on shared features.

SPINELESS INVERTEBRATES

About two-thirds of all known animal species are invertebrates. Invertebrate groups include cnidarians, mollusks, echinoderms, sponges, worms, and arthropods. These animals have few features in common, apart from the fact that they all lack a backbone, or vertebral column. Familiar invertebrates include worms, arthropods such as insects, crabs, and spiders, and snails, which are mollusks. However, many invertebrates are so inconspicuous or tiny that we never notice them. A lot are found only in the ocean. Others, such as insects, live on land and are common worldwide.

Cnidarians

Jellyfish, anemones, and other sea creatures with a mouth surrounded by a ring of tentacles.

Mollusks

Soft-bodied animals that are often protected by a hard shell, as in the Nautilus (right).

Echinoderms
Marine mammals with bodies often in five equal parts. Most have spiny or pimply skin.

Sponges
Simple animals that live attached to the seabed and filter food from the water.

Worms
Animals with long, soft bodies that are round or flat. Some worms live as parasites.

Arthropods
An external skeleton covers a segmented body with a number of jointed legs.



"There may be 40 million undiscovered species"

Birds

Feathered, egg-laying animals with a beak. Most have a lightweight skeleton and can fly.

VERTEBRATE VARIETIES

Most of the animals we know best—including humans—are vertebrates. Their key feature is a backbone, or vertebral column, made of small bones called vertebrae. The backbone is the central part of an internal skeleton, which is moved by muscles. Most vertebrates have limbs (arms or legs) or fins arranged in pairs, complex sense organs, and an obvious brain.

The five types of vertebrate are: birds, mammals, reptiles, amphibians, and fish. Mammals, birds, and certain fish can control their body temperature, making them less dependent on external conditions.

Mammals

Animals covered with fur or hair that suckle their young. Most give birth to live young.

Reptiles

Scaly-skinned animals such as snakes, lizards, crocodiles, and turtles. Most lay eggs.

Amphibians

Animals such as frogs and salamanders, which live partly on land but always breed in water.

Fish

Aquatic swimming animals with spiny or fleshy fins. Most breathe using gills.

EVER-CHANGING ANIMALS



Zebras

A striped coat is a useful characteristic for zebras. It helps them to recognize and bond with their own kind—an important ability for herd animals.

Nothing stays the same for long in nature. Over many generations living things gradually change, or adapt, so that they are better suited to their surroundings. Those that fail to adapt become extinct—they die out. This process of slow change is called evolution, and it has produced the amazing variety of animals that we see today.

HOW EVOLUTION WORKS

Young animals tend to look like their parents because characteristics are copied from parents to offspring. But this copying process is not exact, and sometimes the young develop new characteristics. If a new characteristic is useful—such as a coat color that provides better camouflage—the animal is likely to live a longer and more successful life, producing more offspring that will also have the helpful trait.

SUPERSIZED MAMMALS

Major events, such as vast volcanic eruptions or meteorite strikes, can change animals' surroundings so rapidly that they cannot adapt quickly enough and many species die out. This is called a mass extinction.

After a mass extinction 65 million years ago wiped out the dinosaurs, large mammals evolved to take their place. They included a giant rhinoceros, 18 ft (5.5 m) tall, and giant sloths, beavers, and armadillos.

Giant armadillo

Glyptodon, a distant relative of modern armadillos, lived from around 5 million to 10,000 years ago.

Modern armadillo is much smaller

Sauropods walked on the tips of their toes

Barapasaurus measured 59 ft (18 m) from its head to the tip of its tail

Body was bulky and heavy

Flexible tail helped to balance the long neck

Thick, scaly skin

Pillarlike legs

Barapasaurus—a loser

Sauropod dinosaurs, such as this *Barapasaurus*, were among the many losers of the mass extinction 65 million years ago. The sauropods included the largest and heaviest animals ever to have lived on land.

**"99.9% of all
animal species
that have ever
lived are now
extinct"**



Short, deep head

Long neck
allowed dinosaur
to reach leaves
high up in trees

Broad teeth
for grinding up
plant food

Powerful
bill for
tearing
meat

Bare skin
on head
and neck

LOSERS AND WINNERS

We think of dinosaurs as being long-extinct, but that is not strictly true—their descendants are still with us today. The theropods were a group of dinosaur that walked on two legs. They included the well known *Tyrannosaurus* and *Velociraptor*. About 160 million years ago, some smaller theropods grew feathers, perhaps as a way of keeping warm. Later, they began using their feathered forelimbs to glide or fly. Eventually, these feathered theropods evolved into birds. When the dinosaurs died out after a huge meteorite collided with Earth around 65 million years ago, the birds survived.

Vulture—a winner

When you look at a vulture, you are looking at one of evolution's winners. The scaly skin and reptilian eyes are a reminder that birds are descended from dinosaurs.

Simple
feathers

Three-
fingered
hands

Thick bones
supported the
dinosaur's
huge weight

Stubby feet
like those of
an elephant

Talons on
three-toed feet

Bird ancestor

About the height of a human, the theropod *Guanlong* was a smaller relative of *Tyrannosaurus*. *Guanlong* had a large crest on its head, and its skin may have been covered with simple feathers.

BODY MATTERS

Animal bodies are made up of cells, which are grouped together to form tissues such as muscle and bone, and organs such as brains, kidneys, eyes, and skin. The arrangement of tissues and organs in animal bodies varies enormously, but it tends to be similar in closely related kinds of animal. It is almost always the best arrangement for each species' unique way of life.

Sockets for forward-facing eyes, which can judge distances accurately

Teeth include canines for stabbing and cheek teeth for slicing

Short skull has attachment points for powerful jaw muscles

Backbone is flexible, making the tiger graceful and agile

Deep chest with room for large lungs

Long, powerful legs allow the tiger to leap up to 30 ft (10 m)

Supersharpened, hooked claws can be withdrawn into the foot

Power and stealth

The largest of the big cats, the tiger is the ultimate hunting machine. Its body is slinky enough to creep unnoticed through low vegetation, yet powerful enough to bring down prey as large as wild oxen.

ANIMALS WITH BACKBONES

Vertebrates (birds, mammals, reptiles, amphibians, and fish) have an internal skeleton made of cartilage or bone. The skeleton supports the body, provides a frame to which muscles can attach, and protects internal organs. The brain is housed inside a skull. The spinal cord—a vital part of the nervous system—runs through a backbone that is made up of small, interlocking bones called vertebrae.

No need for legs

Most vertebrates have either limbs (arms, legs, wings, or flippers) or fins. Snakes are an exception. The skeleton of a snake—such as this cobra—consists of just a skull, backbone, and ribs. The ribs on the snake's belly can move apart when it swallows a large meal.

Tail section has no ribs

Joints between vertebrae are very strong

SIMILAR, BUT DIFFERENT

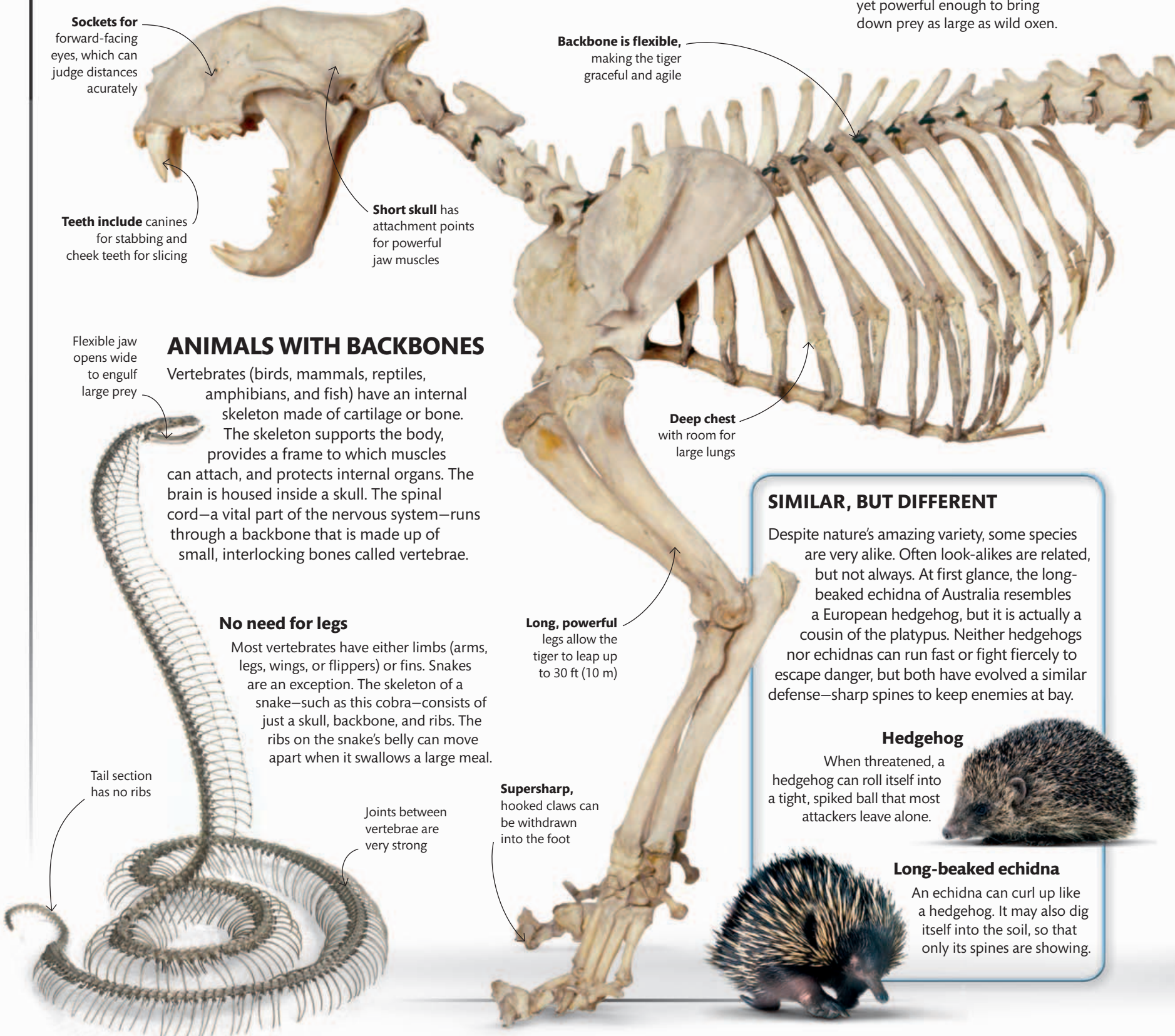
Despite nature's amazing variety, some species are very alike. Often look-alikes are related, but not always. At first glance, the long-beaked echidna of Australia resembles a European hedgehog, but it is actually a cousin of the platypus. Neither hedgehogs nor echidnas can run fast or fight fiercely to escape danger, but both have evolved a similar defense—sharp spines to keep enemies at bay.

Hedgehog

When threatened, a hedgehog can roll itself into a tight, spiked ball that most attackers leave alone.

Long-beaked echidna

An echidna can curl up like a hedgehog. It may also dig itself into the soil, so that only its spines are showing.





MADE-TO-MEASURE ARMOR

Arthropods—such as crabs, insects, millipedes, and spiders—have a jointed external skeleton that fits like a perfect suit of armor. Called an exoskeleton, or cuticle, it covers the animal's entire body, including the mouthparts and eyes. It is made of a light, flexible material called chitin and strengthened with minerals. An exoskeleton gives excellent support and protection, but it limits movement and growth.

Tough case

Body is long and narrow, perfect for moving through dense forest

In some large arthropods, such as this land crab, the exoskeleton is reinforced with a chalky substance called calcium carbonate, which makes it extremely hard.

Narrow hips suited for running and jumping rather than climbing

Vertebrae have interlocking shapes

Long thigh bones are embedded in some of the tiger's largest muscles

Ankle joints raised off the ground act as shock absorbers

Tigers walk on four toes on each foot

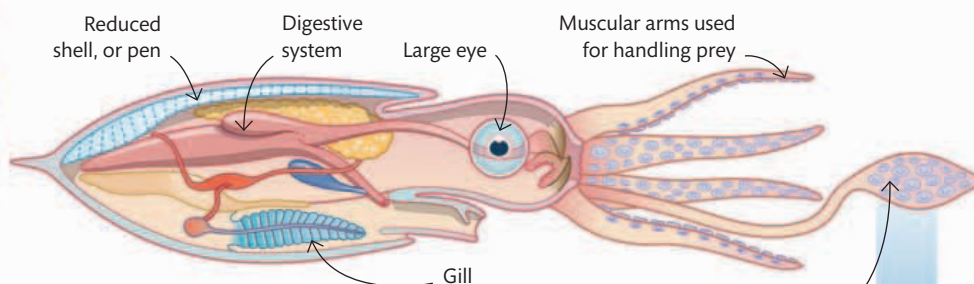
ROOM TO GROW

Unlike the internal skeleton of a vertebrate, the exoskeleton of an arthropod does not grow with the animal, so it has to be shed, or molted, and regrown regularly. This Ecuadorian Brown Velvet Tarantula Spider will be soft and vulnerable for a few hours after molting. It will hide in a safe place and wait for its new, roomier exoskeleton to harden.



MANAGING WITHOUT A SKELETON

Invertebrates that do not have an external skeleton support their bodies in a variety of ways. Most worms hold their shape by internal liquid pressure (a little like a balloon full of water), while starfish and sea urchins grow a chalky shell immediately under their skin. Many mollusks, including clams and oysters, have a tough chalky or pearly shell. Others, such as squid and octopuses, rely mainly on the support of the water in which they live.



Squidgy squid

A squid has no skeleton, but some squid do possess an internal shell called a pen, which protects the animal's rear. The muscular body relies on the support of seawater, and some species can grow to enormous sizes.

Extendable tentacles used for attack and defense

Long tail aids balance when running and climbing

“A large lobster may molt up to 100 times during its life”

ANIMAL LIFESTYLES

All animals share the same basic characteristics—they are all able to grow, feed, reproduce, move, sense the world around them, and communicate at some level. But the ways in which animals do these things differ enormously, giving rise to a spectacular variety of animal lifestyles and behaviors.

Predator and prey

In order to eat, a chameleon's stealth and precision aiming must triumph over the alert senses, camouflage, and agility of its insect prey.

Tongue accelerates faster than a fighter jet

Target snared up to 1.5 body lengths away

ENERGY SOURCE

Plants get their energy from sunlight, but animals have to obtain the energy they need to live and grow by eating other living things, or their remains. Plant-eating animals are called herbivores, and meat-eaters are carnivores. Tigers and most other carnivores are predators—hunters that kill other animals (known as prey) to get fresh meat. A few carnivores, including vultures, are scavengers; they do not kill but feed on animal remains. The least fussy eaters are omnivores, such as rats; they consume a wide variety of foods.



Tongue-twister

The giraffe, a herbivore, is a browser, meaning that it eats leaves that it plucks from trees. Its flexible tongue can work around even the sharpest thorns. Other herbivores have different feeding habits. Grazers, for example, eat grass, and omnivores munch seeds.

SENSITIVE CREATURES

Senses are vital to an animal's survival, helping it to avoid danger and to find food or a mate. Like humans, most animals can detect light and touch, have a chemical sense such as taste or smell, and can detect sound waves or other vibrations. Some animals possess extra senses very different from our own, such as the way migrating birds can find their way using the Earth's magnetic field.



Seeing the invisible

Honeybees can detect ultraviolet light, which human eyes are unable to see. Flowers often have ultraviolet markings, invisible to us, that direct bees to their pollen and nectar.



Light collectors

Most nocturnal animals have large eyes to gather as much light as possible. The Spectral Tarsier's eyes are bigger than its brain!

Bald Eagle landing

Flight uses up a lot of energy, but it offers birds such as this Bald Eagle great rewards—including the ability to cover large distances rapidly.

**“Blue Whale calls
can be heard
halfway around
the world”**

ANIMALS IN MOTION

Most animals live in ever-changing environments, and they often need to move around to find new food sources, places to live, and others of their kind in order to breed. Even animals that live attached to one spot as adults—such as barnacles—are usually mobile when young. More active animals include walkers, runners, jumpers, crawlers, climbers, swimmers, gliders, and flyers. Traveling uses energy, so animal bodies are usually shaped to make a particular style of movement as effortless as possible.

Dive! Dive! Dive!

Like many swimming animals, penguins have streamlined bodies. They use their muscular flippers to achieve startling speeds, and their feet as steering rudders. They sometimes leap clear of the water—a stunt known as “porpoising.”

SENDING SIGNALS

Animals have many ways of communicating with each other, including visual signals, sounds, and chemical messages. The messages are usually simple—a scent deposit to mark out territory, a warning cry or a mother’s call to find her young, or a display to show aggression or attract a mate. Communication also helps social animals such as wolves and bees to live and work in groups.



Dazzling display

When a male peacock spreads out his tail fan, his shimmering plumage says “I am fit and strong” to potential mates. He also rattles his feathers to gain the female’s attention.

Long-distance call

Wolves howl to let other pack members know where they are, and to tell rival packs to stay out of their territory. In the open, their calls carry for up to 10 miles (16 km).





AMAZING ANATOMY

Animals come in all shapes and sizes. There are big ones, small ones, hairy ones, and scaly ones. Some are superstrong or ultra tough; others can stick to walls or deliver a nasty bite. Dive in and discover the ones that stand out from the crowd.

STRONGEST MAMMAL BITE

TASMANIAN DEVIL

Although scarcely bigger than a year-old bear cub, the Tasmanian devil has the strongest bite in relation to its size of any mammal. Its jaws can snap bones. It's an efficient scavenger of carrion, capable of eating a whole carcass, fur and all. It occasionally turns into a fearless killer—even attacking venomous snakes.



Bold white chest marking

AT A GLANCE



- **SIZE** Head and body 21–32 in (53–80 cm) long, plus tail 9–12 in (23–30 cm) long
- **HABITAT** Heathland and forest
- **LOCATION** Tasmania
- **DIET** Carrion, living animals, and sometimes plant material

PROTECTIVE MARKINGS

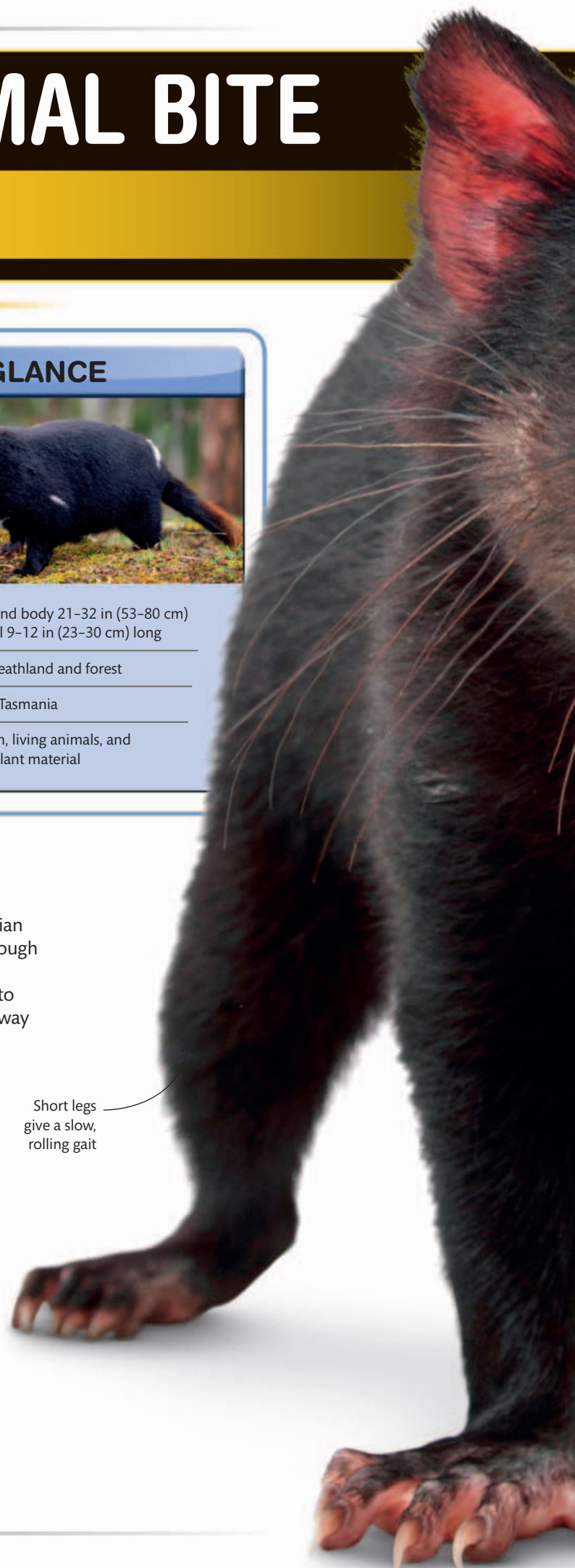
The white chest patch of a Tasmanian Devil is particularly distinctive—although a small number of animals are born without it. The patch may act as a flag to draw aggressive bites from other devils away from the more vulnerable face.

CARCASS COMPETITION

Most Tasmanian Devils are not aggressive unless threatened or competing with another devil for food. When more than one animal is drawn to the same carcass, a noisy squabble might develop, but only rarely does it escalate into a fight. At times like this, growls, snorts, snarls, and screeches can be heard a very long distance away.



Short legs give a slow, rolling gait





Broad head with large jaw muscles

Large pink ears with rounded tips

Coarse, blackish brown fur

Nocturnal hunter

The Tasmanian Devil is a stocky, carnivorous marsupial that spends the day in hollow logs or burrows made by other animals, such as wombats. It emerges at night to search for food, relying mostly on its good sense of smell.

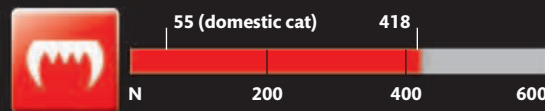


Tasmanian Devils can eat the equivalent of up to 10% of their body weight in meat a day. When well fed, they store fat in their tails in case food becomes scarce.



STATS AND FACTS

BITE STRENGTH



PREY WEIGHT



DISTANCE



“A Tasmanian Devil’s sneeze can be a sign of aggression”



COZY START

A female Tasmanian Devil produces a litter of two to four tiny babies. They spend just over three months in her pouch, suckling and growing before they are moved to a den. The father sometimes helps keep the babies clean, and when they are old enough, the parents take turns carrying them around piggyback style.

WARMEST COAT

SEA OTTER

The coat of a Sea Otter is as cozy as a down comforter. There are more hairs in a square inch of its incredibly thick fur than there are on a whole human head. The Sea Otter certainly needs it. It lives in the cold waters along the north Pacific coastlines, but lacks the layer of fatty blubber under its skin that other sea mammals use as insulation. Instead, it relies on its dense coat to trap warm air close to its body. When floating, it holds its paws above the water to stop them from getting too cold.

“There can be
800 million
hairs in an adult
otter’s coat”

AT A GLANCE

Dark fur on
body, white
on head



- **SIZE** Head and body 3¼-4 ft (1-1.2 m) long, plus tail 10-14½ in (25-37 cm) long
- **HABITAT** Shoreline and shallow ocean waters, within half a mile (1 km) of coast
- **LOCATION** Japan and western coastal North America
- **DIET** Slow-swimming fish, sea urchins, crabs, and mollusks

STATS AND FACTS

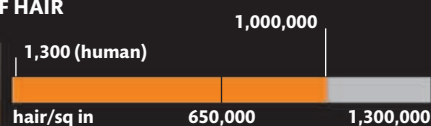
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POUNDS

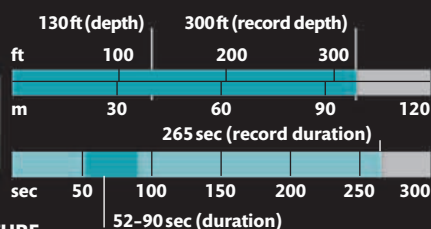
RECORD WEIGHT

The thickest part of the Sea Otter coat is the underfur that is closest to the skin, helping the animal stay warm when diving in icy water.

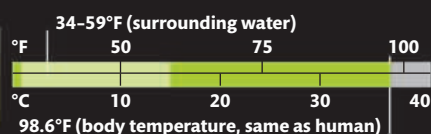
DENSITY OF HAIR



DIVE



TEMPERATURE



TOP SWIMMING SPEED

5

MPH



**DENSEST
FUR**

LAIID-BACK DRIFTERS

Sea Otters rest by floating in the water on their backs—and usually sleep this way, wrapping themselves in seaweed so they don't drift out to sea. They even use their bellies as dinner tables, balancing a rock on their chests as an anvil to crack open clam shells.

TALLEST ANIMAL

GIRAFFE

The **tallest giraffe** could easily look through a second-floor window without even stretching. A combination of long legs and long neck means the giraffe can not only eat leaves from high branches, but it can spot danger farther away, too.

STATS AND FACTS



WEIGHT OF HEART



HEARTBEATS



Special blood vessels in the head stop blood from rushing to it when the giraffe stoops down.



TONGUE TWISTER



Tongue is about 20 in (50 cm) long

Horns are bony outgrowths of the skull

Ligament helps hold head and neck up

A giraffe can reach even farther into its favorite acacia trees with its long tongue. The tongue is extremely flexible so it can wrap around the acacia's thorny shoots to pluck the succulent leaves. A coating of sticky saliva blankets any thorns that end up being swallowed.

Neck bones have ball-and-socket joints that give greater flexibility

Neck muscles are strong to support heavy bones



A HIT TO THE NECK

Male giraffes frequently do battle with one another by swinging their necks and bashing rivals with their heads. This helps more dominant males keep their authority within the herd. Battles are usually gentle, but if a female is around, things may escalate and a male might even be knocked unconscious.

"Every step a giraffe takes is 15 ft (4.5 m) long"

