

**Did You Know?**

# Animals

Amazing answers to more than **200** awesome questions!





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Know?**

# Animals







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Know?**

# Animals

Derek Harvey





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**Author** Derek Harvey

**DK LONDON**

**Project editor** Sam Priddy

**Designer** Lucy Sims

**Editors** Katy Lennon, Olivia Stanford

**US editor** Margaret Parrish

**Additional design** Emma Hobson

**Managing editor** Laura Gilbert

**Managing art editor** Diane Peyton Jones

**Pre-production producer** Nikoleta Parasaki

**Producer** Srijana Gurung

**Art director** Martin Wilson

**Publisher** Sarah Larter

**Publishing director** Sophie Mitchell

**DK DELHI**

**Project editor** Suneha Dutta

**Editor** Ishani Nandi

**Assistant art editor** Kartik Gera

**Art editor** Nehal Verma

**Senior editor** Shatarupa Chaudhuri

**Senior art editor** Nishesh Batnagar

**Managing editor** Alka Thakur Hazarika

**Managing art editor** Romi Chakraborty

**DTP designers** Bimlesh Tiwary, Syed Md Farhan

**CTS manager** Balwant Singh

**Production manager** Pankaj Sharma

**Senior picture researcher** Sumedha Chopra

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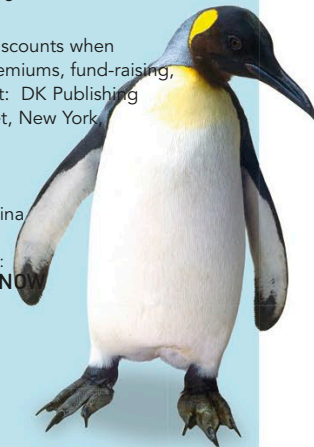
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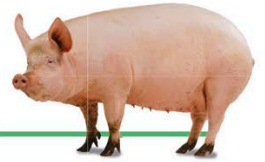
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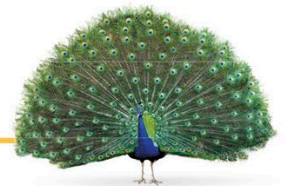
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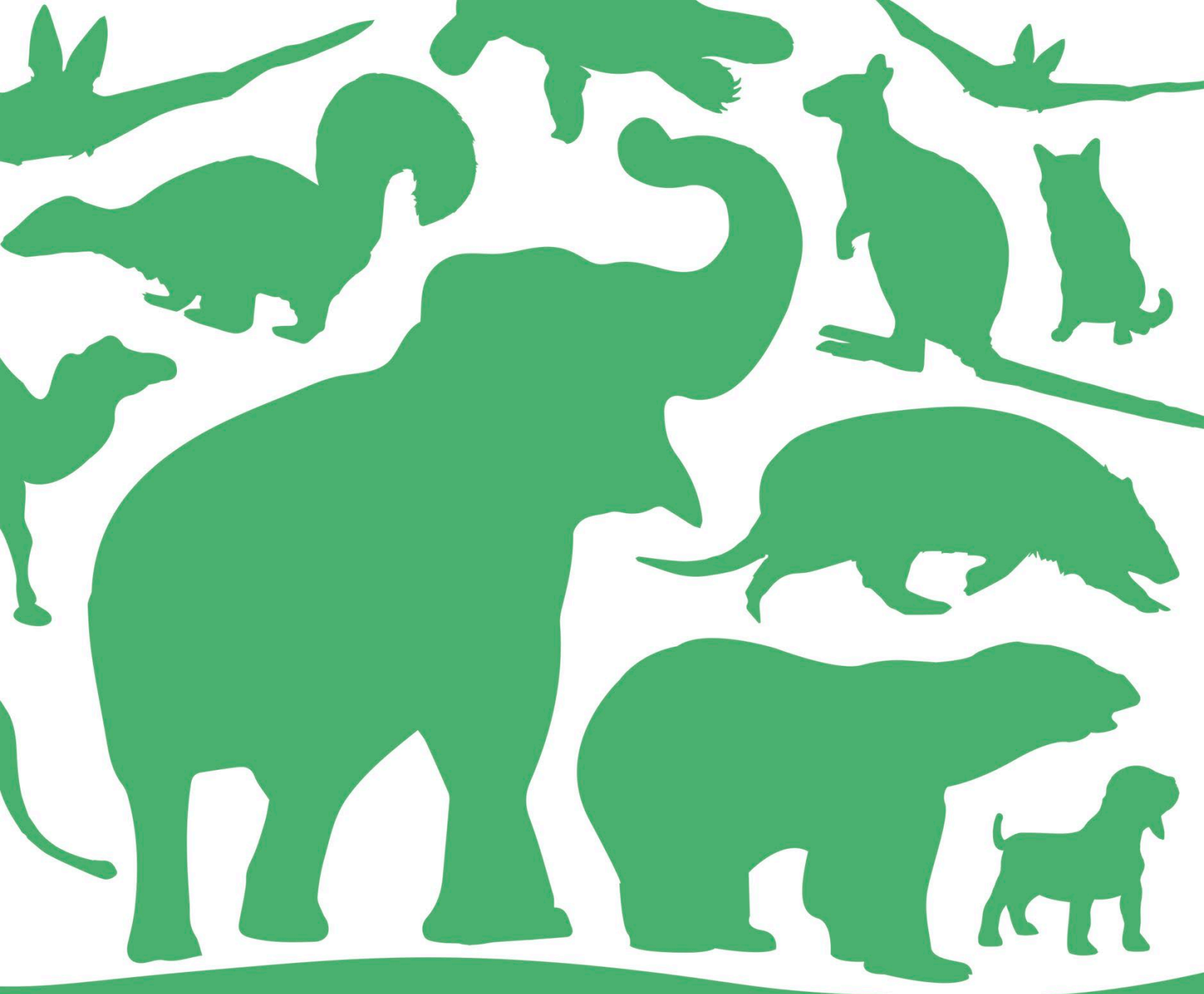


Discover which colors I can see on pages 34–35.

Find out how I walk up walls on pages 114–115.







# Mammals

Mammals are warm-blooded animals that are usually covered in fur. All mammal moms produce milk to feed their babies.

**F..... Nose**

Wolves can pick up a prey's scent trail from up to 1.5 miles (2.4 km) away.

**Pack leader**

A dominant (alpha) male guides the pack and takes control of hunts. .... ↗



# Why do wolves live in packs?

A wolf is a skillful predator. It has sharp teeth, a strong bite, and is incredibly cunning. But it has another deadly weapon: teamwork. Wolves work together in packs to hunt down large prey.



## Quick quiz

1. How many wolves are in a wolf pack?
2. What happens when two packs meet?
3. Why do wolves howl at the sky?

See pages 134–135 for the answers



## Expressions

Wolves use facial expressions, along with scent and sounds, to communicate with other members in the pack.

Wolves can take down prey as large as an elk.

## Which other animals hunt together?



### Lions

Most cats hunt alone, but female lions work in a team. Together, they stalk their prey from all sides—so when it finally bolts there is a good chance it will run straight into one of them. The other lions then help to bring down the kill, before taking it back to the family.



### Humpback whales

Groups of humpback whales circle beneath schools of tiny fish and create a bubble "net" to herd them tightly together. The whales then swim upward at great speed to gobble down massive mouthfuls of fish in one fell swoop.

# Why do tigers have stripes?

Many tigers have golden fur and thin black stripes to blend into long, dry grass. Being well camouflaged against their surroundings allows tigers to get very close to their target without being seen—so a quick pounce is all that's needed to catch dinner.



## Can you spot these hidden animals?



### Leafy seadragon

This fish, a relative of the seahorse, has leaflike fins so that it is perfectly camouflaged among seaweed.



### Leaf-tailed gecko

This lizard's skin matches the appearance of bark. By lying still on a branch it can catch unsuspecting insects.





## Flashing ears

In addition to black stripes on their bodies, some tigers also have white dots on the backs of their ears. These may help cubs follow Mom through the grass.

## Vertical stripes

Black stripes help to break up the outline of the tiger's body. This fools prey, even when the tiger is really close to it.

## Golden color


Most tigers have orange fur, which matches the golden color of the grass and the fallen leaf litter in the forest.



## Quick quiz

1. What does "camouflage" mean?
2. Which other cats have stripes?
3. Why do zebras have stripes?

See pages 134–135 for the answers



More than half of the 900 known species of bat use echolocation when they are in flight.



### •Moth

Bats hunt all kinds of flying insect—but fat moths provide particularly big meals.

# How do bats find food in the dark?

Bats fly at night and most have a taste for fluttering insects. But how can you find dinner in the air when you can't see it, smell it, or hear it? The trick is to make a clicking noise, and listen for the echo that bounces back from the tiny prey. This is called echolocation.

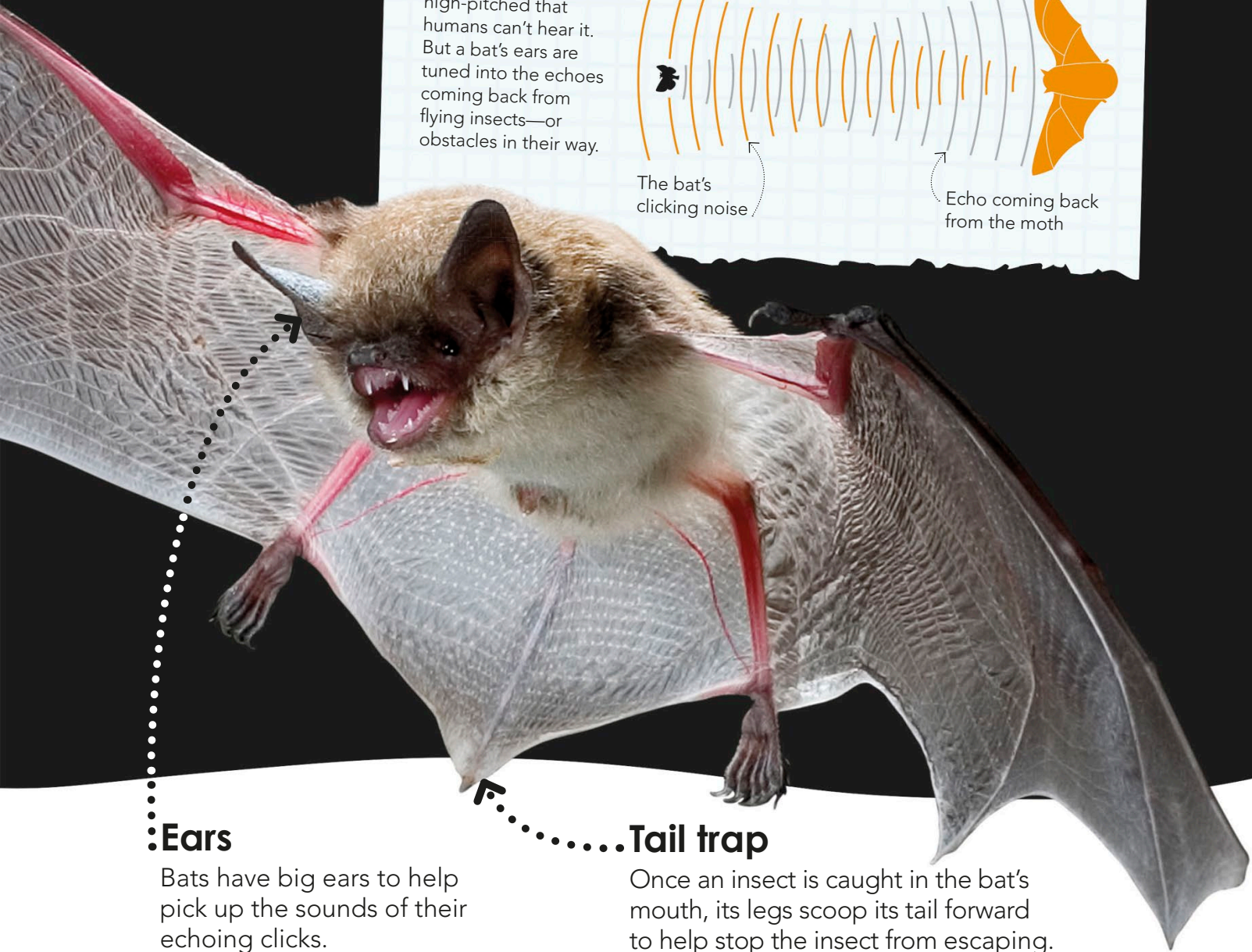
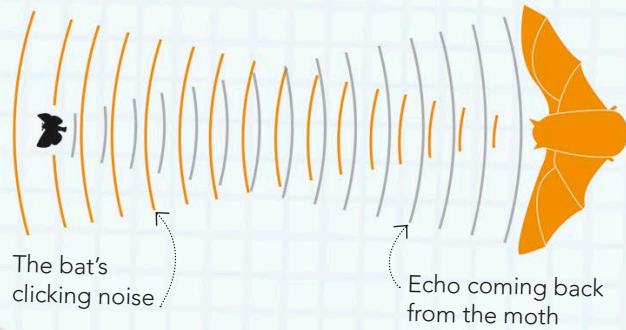
## ? Quick quiz

1. Can bats see?
2. How do bats produce their clicks?
3. Do all bats feed on insects?

See pages 134–135 for the answers

## How echolocation works

The call of a bat is so high-pitched that humans can't hear it. But a bat's ears are tuned into the echoes coming back from flying insects—or obstacles in their way.



### Ears

Bats have big ears to help pick up the sounds of their echoing clicks.

### Tail trap

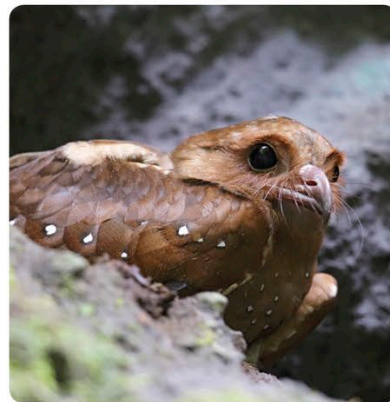
Once an insect is caught in the bat's mouth, its legs scoop its tail forward to help stop the insect from escaping.

## Can any other animals use echolocation?



### Dolphins

A dolphin makes whistles and clicks in air sacs under its blowhole. The sounds help dolphins communicate with one another, but are also used for echolocation in murky waters. Dolphins listen for clicks echoing back from tasty fish.



### Oilbirds

Oilbirds spend the day sleeping in caves, but use echolocation when they wake up in the evening. The echoes of their clicks in the darkness help prevent midair collisions with other oilbirds, before they emerge from the cave to eat fruit.

# What is a tusk?

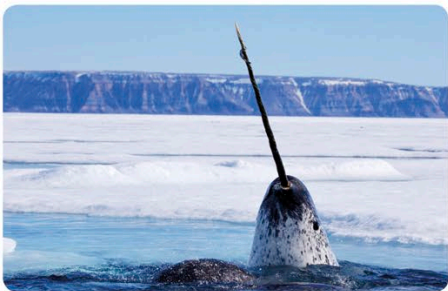
Imagine having teeth that keep on growing, even when they've extended out of your mouth. Walrus tusks are extra-large canine teeth that grow downward from the upper jaw, then curve backward. Like elephant tusks, they are made of a hard substance called ivory.

## Are all tusks the same shape?



### Babirusa

Some pigs have tusks that grow upward from the lower jaw. They are especially curly in tropical pigs called babirusas.



### Narwhal

Most animal tusks are curved and come in pairs, but narwhals (relatives of dolphins) have single straight ones.

An elephant's tusk is the largest tooth of any living animal.





A close-up photograph of a walrus resting on a rocky beach. The walrus has two large, curved, yellowish-white tusks. Its skin is thick and wrinkled, and it has many long, white whiskers. The background shows the ocean and a cloudy sky.

←.....**Show off**

Bigger walrus bully smaller ones to get the best resting spots by leaning backward to really show off their tusks.

↖.....**Whiskers**

Walrus don't use their tusks to dig for food, but snuffle in the mud for clams using their sensitive whiskers.

↙.....**Tusks**

Walrus use their tusks for cutting holes in the ice to breathe through, or to hang off icy ledges while snoozing in the water.



## Quick quiz

1. Where do walrus live in the wild?
2. Why do walrus have such thick skin?
3. Why do male walrus have bigger tusks than females?

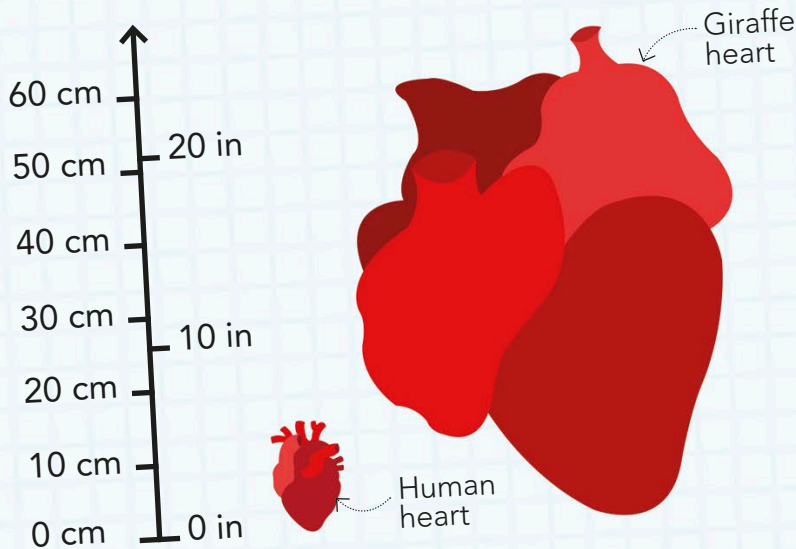
See pages 134–135 for the answers

# Do giraffes get dizzy when they bend over?

When a person bends over quickly and stands back up the sudden rush of blood to and from the brain can cause dizziness. Because giraffes grow as tall as houses, they have special blood vessels in their necks to stop this from happening.

## Heart to heart

Giraffes need a massive heart to pump blood upward through their long necks.



A giraffe can grow to 20 ft (6 m) tall, making it the tallest land animal alive.

### ..... Long neck

When the giraffe's head is down, special valves in its blood vessels snap shut to stop blood from rushing downward too quickly and flooding the brain.

### ..... Back of the head

A net of tiny tubes at the base of a giraffe's skull act like a sponge to reduce the extra flow of blood when its head is down.

### ..... Long legs

A giraffe's legs are so long that it has to stretch them outward for its head to reach the ground to drink.

## ? Picture quiz



Which long-necked animal is this?

See pages 134–135 for the answer

## Why do some animals have long necks?



### Gerenuk

This African gazelle reaches leaves by stretching its long neck and even standing up on its back legs.



### Giraffe-necked weevil

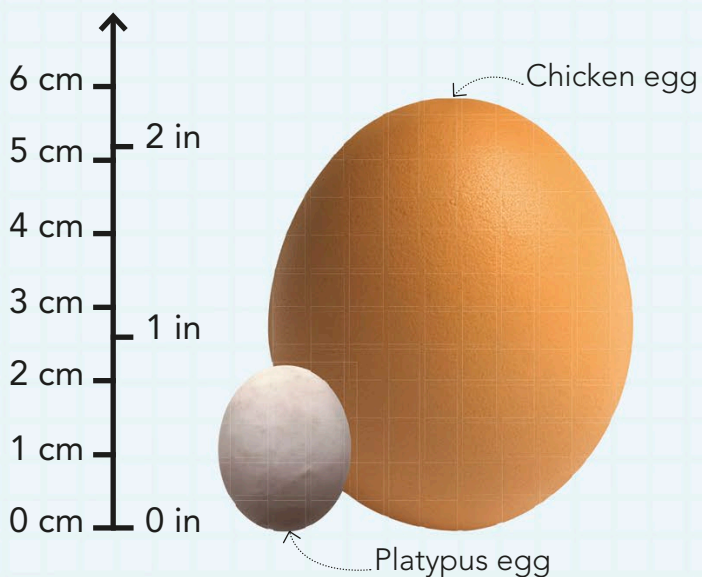
Male giraffe-necked weevils use their long necks to fight each other when competing for mates.

# Do mammals lay eggs?

Most mammal moms give birth to live young, but the platypus and echidna from Australia lay eggs instead. Mammals that lay eggs are called monotremes. They keep their eggs warm until they hatch into blind, hairless babies. The mother then feeds them on milk, just like other mammals.

## Comparing eggs

Platypus eggs are often less than half the size of the average chicken egg. They hatch approximately 10 days after they are laid.



## Ducklike bill

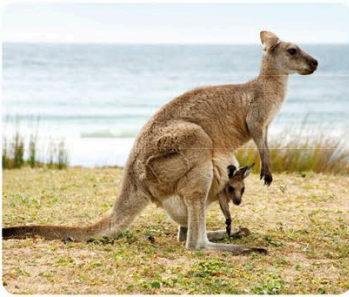
The platypus has a rubbery bill for scooping up worms and shrimp to eat. Females need this food to have enough energy to produce milk for feeding their young.

## Limbs

The platypus has webbed feet to help it swim through water. Males have a poisonous spike on their heel, which they use for self-defense and to compete for mates.



## How do other mammals look after their young?



### Marsupials

Most marsupials keep their young in pouches. Marsupial babies are tiny when they are born: a newborn kangaroo is no bigger than a peanut. Babies stay in their mother's pouches and drink her milk to grow strong.



### Placentals

Placentals, such as these pigs, are mammals that keep babies in their womb so they can grow bigger before birth. Moms develop a placenta—a special organ that provides food for the baby while it is in her womb.

## ? Picture quiz



Is a cat a monotreme, a marsupial, or a placental?

See pages 134–135 for the answer

### Soft fur

Short, waterproof fur keeps the platypus and its egg warm in its bankside burrow.



### Ears

Elephants use their ears a bit like fans. Flapping them helps to cool them down.

### Blood vessels

Elephant ears contain lots of blood vessels. Warm blood flows through them and heat escapes from the ear's surface.

### Trunk

An elephant's trunk is its most important tool. It is used for smelling, touching, and breathing—as well as squirting water over itself to keep cool.



## Quick quiz

1. Where do elephants live in the wild?
2. How long do elephants live for?
3. What is an elephant "matriarch"?

See pages 134–135 for the answers

# Why do elephants have big ears?

As the biggest land animal, elephants can get incredibly hot living under the tropical sun. The African elephant's enormous ears help it to lose some of the heat that is generated by its massive body.

## How do other animals cool down?



### Indian rhinoceros

There's nothing like rolling around in cool mud. Big thick-skinned mammals, such as this rhinoceros, find it a good way to escape the heat of the day.



### Shovel-nosed lizard

This African lizard performs acrobatics to stop its toes from burning on the sun-scorched sand. It lifts its feet alternately, so each foot touches the surface for just a short time.

# What's in a camel's hump?

Camels have special features for surviving in the desert. You could travel a long way before finding food or water, but this doesn't bother a camel. Its humps contain enough fat to keep it alive for up to three weeks. Water is no problem either. When a camel gets the chance, it can guzzle a bathtub's worth of water in 10 minutes.

## Eyelashes

Sandstorms are common in the desert, so camels have long eyelashes to stop sand from getting in their eyes.

## Who can survive the longest without food?



### Crocodiles

A crocodile can gulp down huge prey—even digesting bones, horns, and hooves. A big meal like this can keep it going for months before it has to kill again.



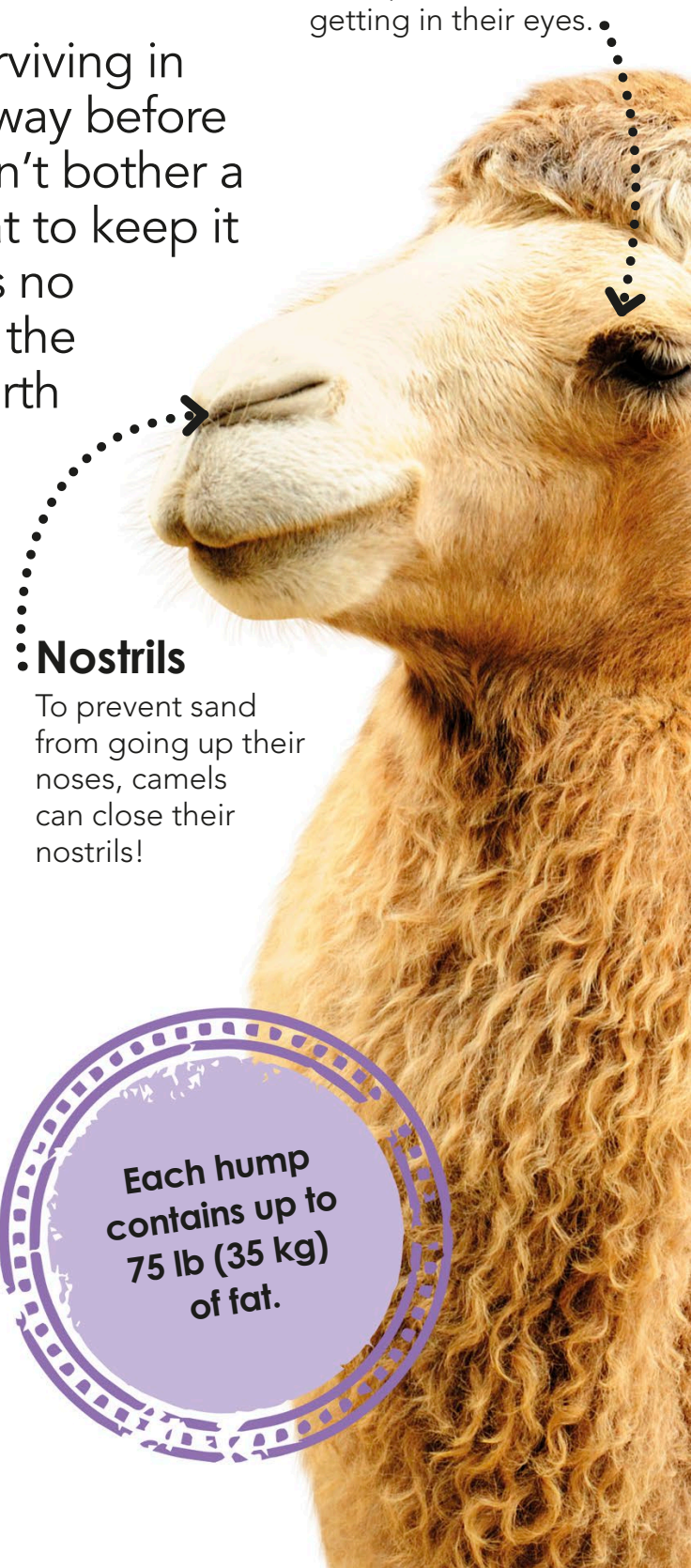
### Olms

This strange white salamander inhabits cold, dark cave waters in Europe. It can go without food for years and has a lifespan of 100 years or more.

## Nostrils

To prevent sand from going up their noses, camels can close their nostrils!

Each hump contains up to 75 lb (35 kg) of fat.





### Floppy humps

If the camel stops eating it starts to use the fat stored in its humps, which then become floppy! When it has another meal, the fatty humps build up again.



Normal humps

Floppy humps

### Humps

Bactrian camels have two humps, while dromedary camels only have one.



### ? True or false?

1. Camels get water from their humps.
2. Lots of camels live in Australia.
3. Camels defend themselves by spitting.

See pages 134–135 for the answers

# Can porcupines shoot their spines?

Porcupines cannot shoot their spines, but they don't really need to. An angry porcupine charging backward can put off the hungriest of predators. In addition to this, their long spines can break off to lodge in the flesh of any animal that gets too close.

## ? Picture quiz



Which animal has had a run-in with a porcupine?

See pages 134–135 for the answer



### ←...: Wary lion

Even a big predator like a lion is careful around a prickly porcupine. Just a single spine gives a painful jab.

## What other animals have defense tactics?



### Skunk

Skunks have black and white markings that warn predators to stay away from them. If an approaching animal is not careful it may get a nasty surprise. If threatened, a skunk will do a headstand and squirt a stinking fluid from glands near its bottom. It can aim for the eyes to blind an attacker.



### Armadillo

An armadillo has no way of fighting opponents if it is attacked. Instead, it has bony plates under its skin, which form a shield over its back and head. An armadillo can even roll up into a tight ball so that even its soft belly is protected by its armor.

Porcupine spines can kill! A lion can die from an infected spine injury.

### Puffed up

A porcupine can raise its spines just like many mammals can raise their hair. It makes it look bigger and scarier to an approaching predator.

### Alarming tail

A porcupine's tail spines are hollow, so when it shakes its tail it makes a loud rattling warning sound.



# How do monkeys swing through the trees?

Monkeys use their grasping hands and feet for climbing—but not all have the extra-special skills for swinging through branches. Some South American monkeys, such as the spider monkey, can do it with the help of their gripping tail. The tail works like a fifth limb, helping the hanging monkey swing across big gaps between the high branches.

## Long arms

Spider monkeys have long arms for hanging from the branches. This makes them more acrobatic than many other monkeys.

Spider monkeys get their name from their spiderlike limbs and tail.

## Grasping tail

A spider monkey's tail is prehensile, which means that it is used for grasping. Its palmlike patch of bare skin helps give better grip.



## Which animals speed through the trees in a different way?



### Gibbons

Gibbons, from Southeast Asia, are the king of the swingers. They use their hooklike hands and extra-strong arms to swing forward under the branches.



### Sifakas

This Madagascan lemur has strong legs for leaping from tree to tree, while gripping the trunks with its hands. It uses its tail to help it keep its balance.



### Long fingers

Spider monkeys have long fingers for hooking over branches. Each foot has a big toe that can also grip.



### Quick quiz

1. Do all monkeys have a prehensile tail?
2. Who swings through the trees the fastest?
3. How can the hands or feet of monkeys grip so well?

See pages 134–135 for the answers

# Why do lions have sharp teeth?

Animals that eat mostly meat need teeth as sharp as knives. Lions have pointed teeth that can pierce the tough flesh of a large buffalo quickly and easily.

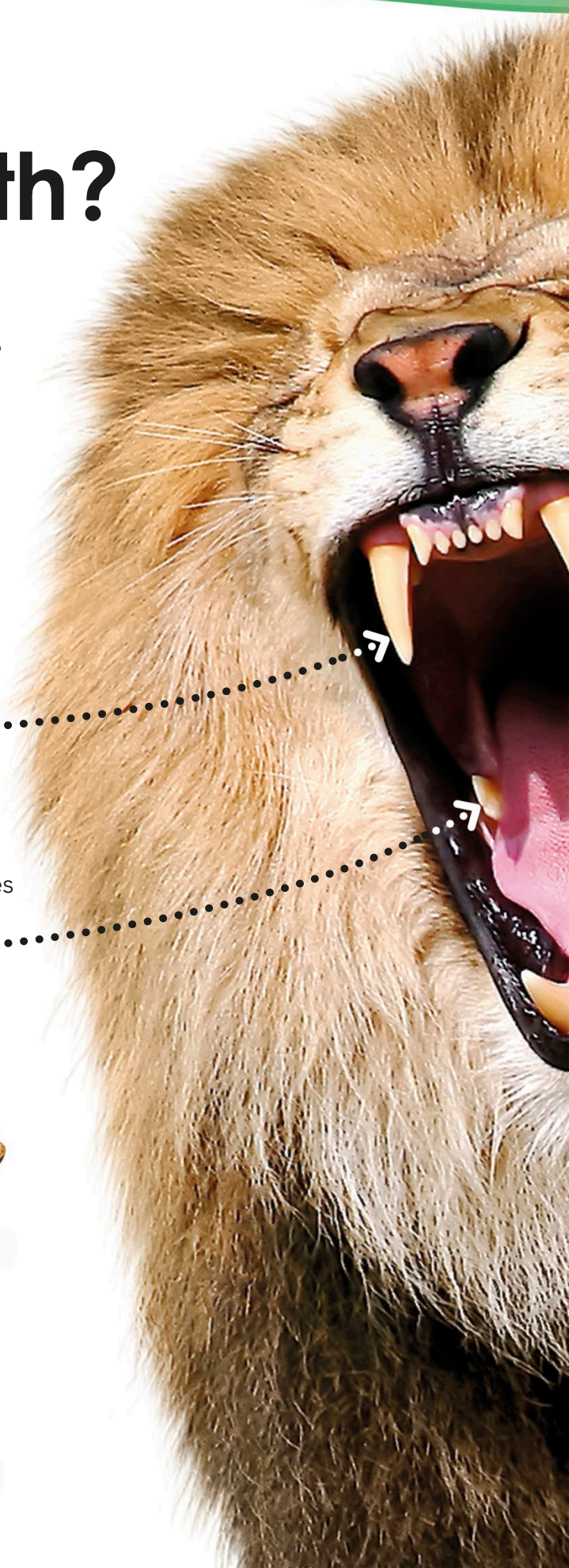


## Canines

Lions suffocate their prey by clamping their front canine teeth around the victim's throat.

## Back teeth

A lion's strong back teeth have sharp edges that work like blades to slice up prey.



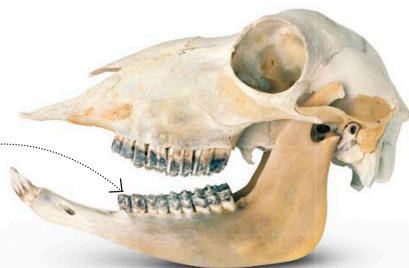
## Carnivore teeth

Carnivores (meat-eaters) have sharp teeth, as well as strong jaw muscles, which enable them to attack with a fierce bite.



## Herbivore teeth

Herbivores (plant-eaters) have flat-topped back teeth with sharp ridges to grind tough leaves.



## Rough tongue

A lion's tongue is covered in tiny hooks that help it scrape meat from bones.



## Do all carnivores have the same teeth?



### Great white sharks

Each tooth of a great white shark has a jagged edge, so each one can slice and cut. Unlike mammals, sharks continually replace lost teeth. Their wide jaws have a strong bite, too.

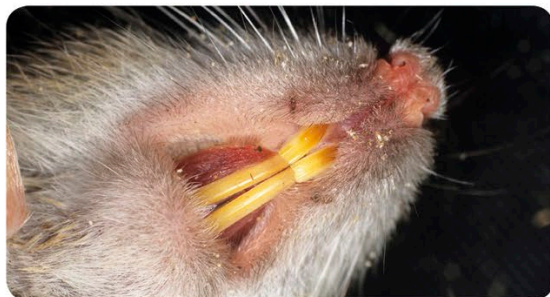


### Crocodiles

The pointed teeth of a crocodile are useful for stabbing, but not much good for slicing. Crocodiles snap their strong jaws and twist their entire bodies to pull prey apart.



## Picture quiz



Who do these teeth belong to?

See pages 134–135 for the answer

# Why do meerkats stand on their back legs?

When you're the size of a squirrel and you live on the ground, you need to stand as tall as possible to keep an eye on what is happening around you. Meerkats stand on their back legs to spot distant danger, and occasionally to enjoy the sunshine!

Meerkats take turns keeping watch for one hour.



## Quick quiz

1. How do meerkats signal that danger is coming?
2. How do meerkats escape from danger?
3. Are all the meerkats in a group related?

See pages 134–135 for the answers

## Back legs

Meerkats walk around on four legs. But they are good at balancing on their two hind legs as well. . . .





## Eyes

Meerkats have excellent vision for spotting predators. Adults keep watch over the group from a high rock and alert each other when they spot danger.

## Heat patch

Meerkats have a patch of bare black skin on their chests that is really good for soaking up heat when they sunbathe.

## Which other animals warn each other of danger?



### Vervet monkeys

Vervet monkeys are high climbers and can spot faraway danger. They have different alarm calls for snakes, eagles, or leopards.



### Weaver ants

When their nests are under attack, weaver ants release special chemicals, called pheromones, that warn the rest of the colony.

# Are moles blind?

They might have tiny eyes, but moles aren't blind. They just can't see very well! If you spend your life in a pitch-black tunnel, a good sense of touch is much more useful, and moles are experts at feeling for worms.

The star-nosed mole has 25,000 touch sensors on its special nose.

## Which animals really can't see?



### Golden moles

The golden mole, from southern Africa, is not actually related to the dark-colored moles. Its eyes are covered with skin so it can't see anything at all.



### Mexican cave tetras

Over a million years ago some of these fish swam into underground cave waters. They've stayed in the darkness ever since, and have become blind by losing their eyes completely.



## Small eye

A mole's eye is barely wider than 0.04 in (1 mm). It is probably sensitive to light, movement, and some color, but it cannot see in much detail.

## Digging claws

In complete darkness, moles use their big-clawed "hands" like shovels to dig through the soil.

## Nosy sensors

The North American star-nosed mole has 22 wiggling, extra-sensitive tentacles on its snout that are used to detect tiny prey.



## Quick quiz

1. What is special about a mole's fur?
2. What are "mole hills"?
3. How much food does a mole eat each day?

See pages 134–135 for the answers



# Can dogs see color?

Our eyes contain different color sensors, so we can see all the colors of a rainbow. But dogs have fewer kinds of color sensors. Like us, they can see blue—but to them, red and green look like yellow.



Colors that humans see



Colors that dogs see

## ? Quick quiz

1. Which animals have good color vision?
2. Why are some people color-blind?

See pages 134–135 for the answers

## Dog vision

The dog sees the blue ball, but the other three colored balls look similar to him: they all look yellowish.



## Can animals sense things differently from humans?



### Bees

Humans can't see ultraviolet light, but bees can. Ultraviolet patterns on flowers, like the dark marks on the image on the right, guide them to sources of nectar.



### Snakes

Some snakes rely on special heat sensors on their heads to find the warm bodies of prey, such as this dog.



### Human vision

In addition to the blue ball, the girl sees three more colors: yellow, green, and red.

### Color sensors

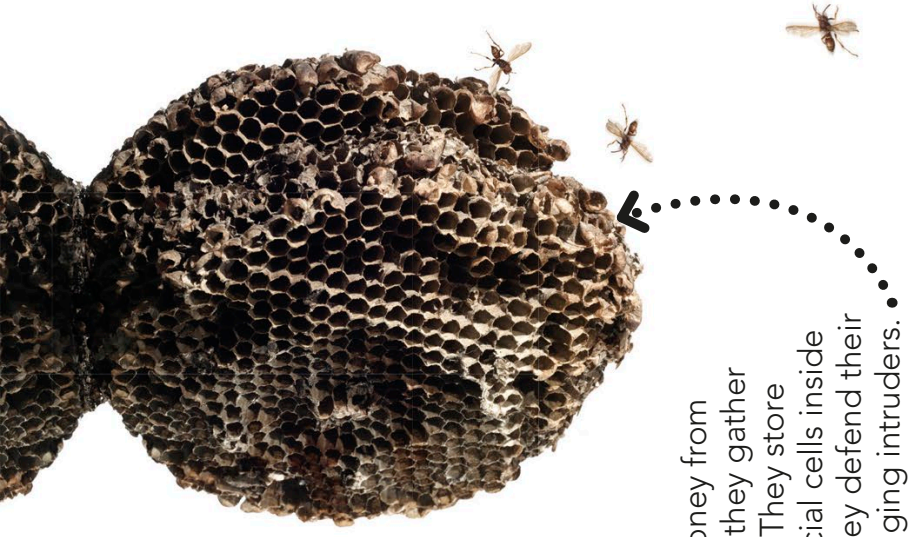
Human eyes have red, blue, and green sensors. The girl uses red and green ones together to see yellow (and red and blue ones together to see violet).

# Do bears eat honey?

Even though bears are related to meat-eating cats and dogs, many also enjoy sweeter foods, like honey. Sun bears, from tropical Asia, are the smallest type of bear, and they have the sweetest tooth of all. They can't resist raiding beehives for honey, and even angry bees won't put them off.

## Sting-proof skin

In the hot tropics, thin fur keeps the bear cool. But its skin is extra thick to help stop bee stings.



## Beehive

Bees make honey from nectar, which they gather from flowers. They store honey in special cells inside a hive, and they defend their supply by stinging intruders.



## Quick quiz

1. Bears are omnivorous. What does this mean?
2. Which kind of bear eats more meat than any other?
3. Which bear eats bamboo?

See pages 134–135 for the answers

## ..... Long tongue

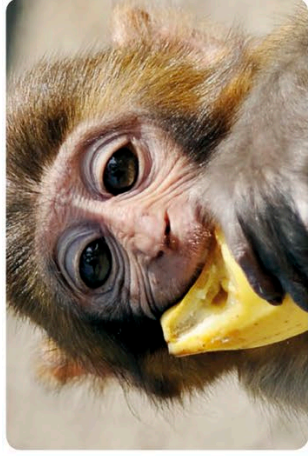
The sun bear has the longest tongue of any bear. It is perfect for lapping up honey or getting into the nests of insects, such as termites.



## ..... Long claws

A sun bear uses its powerful front limbs for climbing and its strong claws can easily rip open honey-filled hives.

## Is it a myth?



### Do monkeys eat bananas?

Some monkeys love fresh fruit, such as bananas. Like humans, they can see color well, and look out for the colors that tell them fruit is ripe.

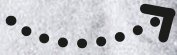


### Do mice eat cheese?

Mice would have to be very hungry to eat cheese, and they stay away from the smelliest kinds. They prefer grain, but also like sweet things like cookies.

### Furry ears

A polar bear's hearing is extremely sensitive, especially to the sound of the bear's natural prey—such as seals. . . . .



### Fatty skin

Many animals in cold places, including polar bears and penguins, have fat under their skin to help trap body heat inside. . . . .



### Killer claws

The polar bear has hunter's claws—but also extra fur on the soles of its feet to help grip the slippery ice.



The polar bear is the world's biggest land carnivore (meat-eater).



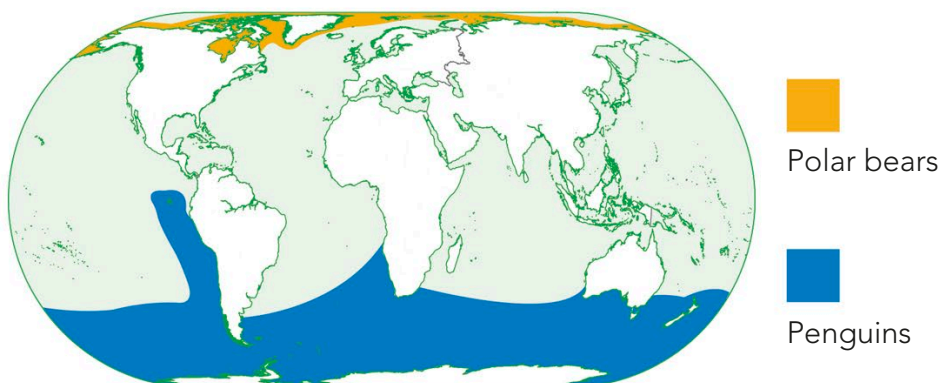


# Why don't polar bears eat penguins?

The Arctic and Antarctic are both covered in snow, but otherwise they really are poles apart. On the top of the world is the icy Arctic, where polar bears live. But at the bottom, freezing Antarctica has different kinds of animals, including penguins. Some penguins live a bit farther north, but none ever cross into the northern half of the planet—so polar bears and penguins never meet.

## Where they live

Polar bears live on land and floating ice in the Arctic. Twenty kinds of penguin live in the southern half of the planet—in places such as South America, Africa, Australasia, and Antarctica.



## What does eat penguins?



### Leopard seals

Danger to penguins usually comes from the ocean. Leopard seals are especially fast in the water and prey on penguins.



### Killer whales

A penguin is hardly a mouthful for a big killer whale—but that doesn't stop it when it wants a snack!

## ? Quick quiz

1. Are there any land predators of penguins in Antarctica?
2. Which kind of penguin lives farthest north?
3. Do any flightless birds live in the Arctic?

See pages 134–135 for the answers





# Birds

Birds are creatures that are covered in feathers. Most birds can fly, but there are a few, such as ostriches and penguins, that can't.

# Why do ducks float?

Hollow bones and air pockets inside their bodies make ducks lighter than water. Oily feathers keep them waterproof, so their bodies don't become wet and heavy. This is why ducks always bob up to the surface and never sink.

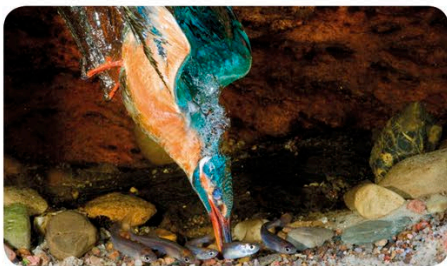
## Feathers

Feathers trap air, which helps ducks float.

## Waterproof

A gland near the duck's tail produces oil. This coats the feathers, making them waterproof enough for droplets to simply roll off.

## ? Picture quiz



Which bird is so buoyant it needs to make a quick dive to catch fish before it pops up?

See pages 134–135 for the answer

## Paddling

On the surface of the water, ducks move forward by kicking their webbed feet.

## Beak

Ducks use their beaks to spread the oil over their entire bodies to make them waterproof.

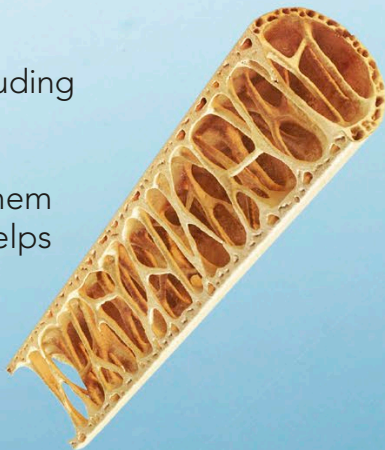


## ... Air float

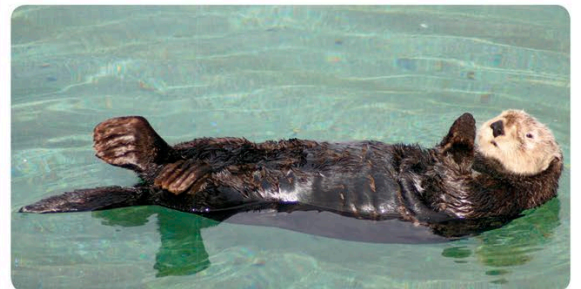
Like most birds, ducks have air sacs inside them, which are like balloons. They fill up with air, making the ducks lighter and helping them float.

## Light bones

All flying birds, including waterbirds such as ducks, have hollow bones that make them lightweight. This helps ducks stay afloat.

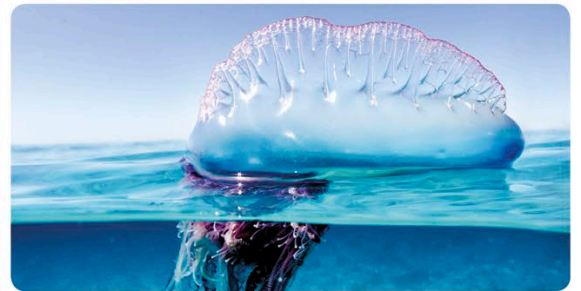


## In what other ways do animals travel on water?



### Floating

The sea otter has the densest fur coat of any animal, which traps a lot of warm air, helping it stay afloat. It can even sleep while floating on its back.



### Sailing

The Portuguese man-of-war has a gas-filled bladder that it uses as a sail to float across the ocean's surface, while its tentacles dangle below.

# Why are flamingos pink?

Flamingos get their color from their food. These birds live near lakes filled with brine shrimp. Although flamingos' feathers are gray or white when they are born, eating the shrimp every day turns their feathers pink.

## Colorful feathers!

A flamingo's color can range from pale pink to dark red and even bright orange. It all depends on how many shrimp they eat.

## ? Quick quiz

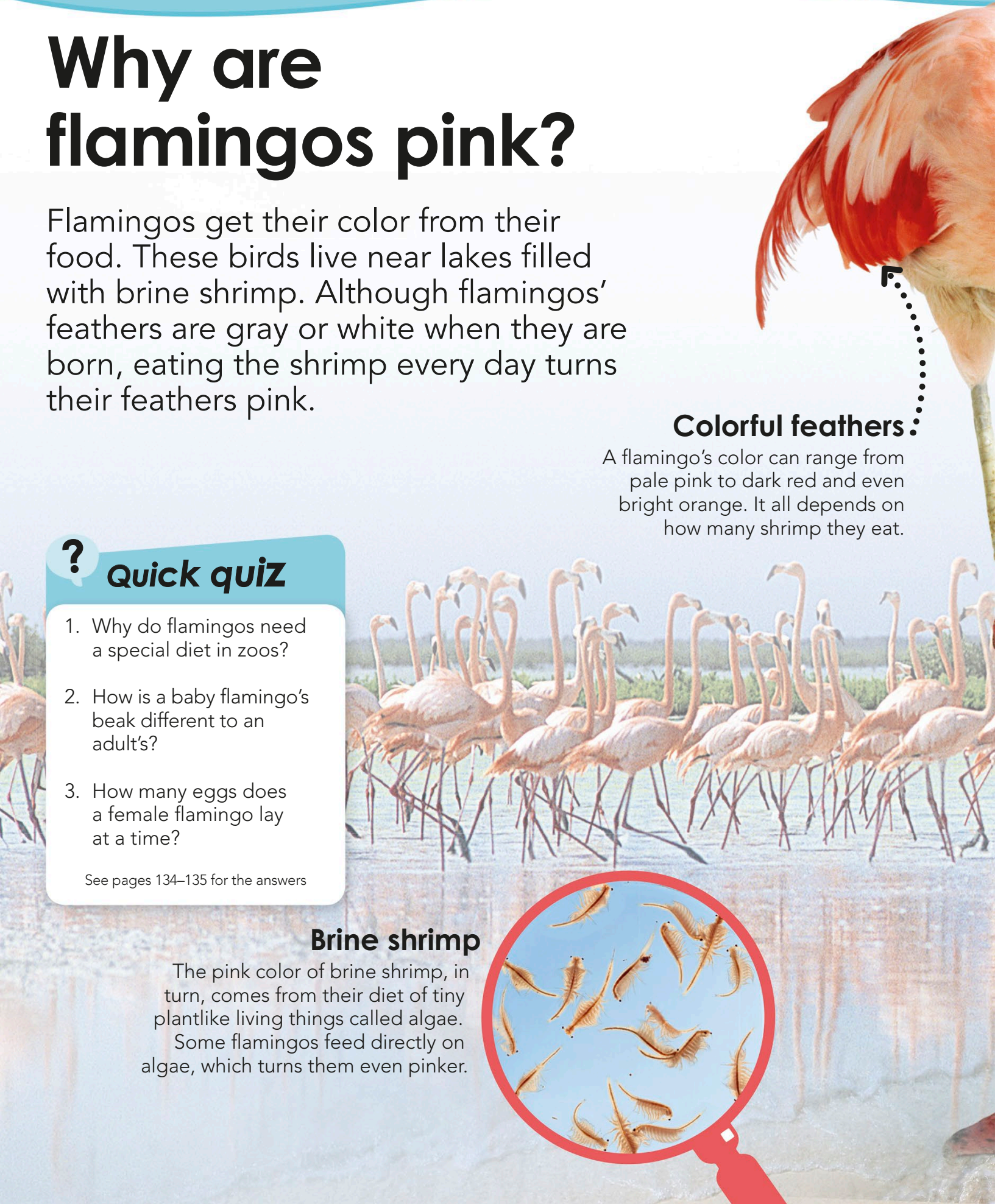
1. Why do flamingos need a special diet in zoos?
2. How is a baby flamingo's beak different to an adult's?
3. How many eggs does a female flamingo lay at a time?

See pages 134–135 for the answers

## Brine shrimp

The pink color of brine shrimp, in turn, comes from their diet of tiny plantlike living things called algae.

Some flamingos feed directly on algae, which turns them even pinker.





### Beak.

To eat, a flamingo dips its beak into the lake, then moves the water over rows of hairs in its mouth with its tongue to strain out the tiny shrimp.



### Foot work

A flamingo uses its feet to pat the mud in the shallow waters of a lake to stir up the brine shrimp. Then it can scoop them up in its beak.

## Who else is colored by food?



### Ghost ants

These insects have see-through stomachs. Any food they eat, such as these colored sugar-water droplets, can be seen from the outside.



### Sea slugs

These soft-bodied sea creatures get many of their bright colors from grazing on corals and anemones.

# How do owls hunt at night?

Owls hunt in the dark using super-sensitive ears that can hear the faintest rustling sound made by animals, even from a distance. Once they have detected their prey, they swoop down silently from the sky to take it by surprise.

## ? Quick quiz

- How do owls eat prey?
  - With small, sharp teeth
  - By swallowing it whole
  - By tearing it into pieces
- An owl can turn its head nearly full circle because...
  - its eyes are too big to move
  - it likes to stretch its neck
  - its backbone is very short

See pages 134–135 for the answers



### Silent wings

The soft, fluffy-edged feathers of an owl allow it to flap its wings without a “whooshing” sound that could alert the prey.

### Clear sounds

The sound coming from the mouse may be faint to humans, but the owl can hear it very clearly.

### Scurrying prey

Small mammals, such as mice, are an owl’s favorite food, and it listens for them moving about on the ground.





## Disk face

The disklike face of a barn owl helps to gather sound waves coming from the prey, and focuses them toward its ears.

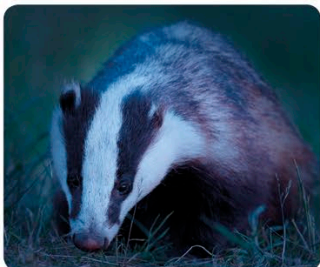
## Sensitive ears

Owls have one ear slightly higher than the other, which helps them to pinpoint the position of prey.

## Hunting grip

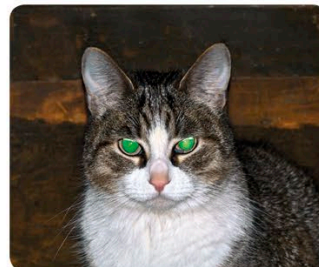
Like other birds of prey, owls have long claws, called talons, which are good for grabbing their prey.

## What helps other animals hunt at night?



### Sense of smell

Many furry mammals, such as this European badger, hunt at night. They do so using their excellent sense of smell. They can even sniff out little animals hiding under the ground.



### Sensitive eyes

Many nighttime hunting mammals, such as cats, have good vision even in dim light. Their eyes have a special layer that reflects and concentrates low levels of light. This makes it seem like their eyes glow in the dark.

# Why can't ostriches fly?

The world's biggest bird is just too heavy to fly. Although an ostrich has big, floppy wings, it is not strong enough to flap and lift its body off the ground. Instead, it relies on powerful legs to sprint away from danger.

## Balancing wings

Ostrich wings are big but too weak for flight. Instead, they are used to keep balance while running. ....

## Heavy duty

Ostrich legs have heavy, solid bones unlike the light, hollow bones of birds that fly. They have powerful muscles that are good for running and even kicking hungry predators.

## ? True or false?

1. Ostriches bury their heads in the sand.
2. Ostriches are the fastest animal on two legs.

See pages 134–135 for the answers



## Level-headed

An ostrich's head stays level, even when running at top speed. This helps it maintain steady vision to find mates and look out for enemies.



## What can happen to flightless birds?



### Extinction

Dodos lived safely on the island of Mauritius until people arrived. The flightless dodos were easily caught by human hunters until there were none left.



### Endangered

Kakapos are flightless parrots that are in danger of becoming extinct. This is because they cannot fly away from predators, such as cats, brought into their habitat by humans.

## Missing bone

Ostriches are missing a part of the breastbone that supports the flight muscles in birds that can fly.

## Running feet

Ostriches are the only living birds with just two toes on each foot. This means their feet can clip the ground like a hoof for superfast sprinting.

# Why are peacocks such show offs?

Peacocks show off their colorful feathers to attract and win mates. They fan out their feathers and rustle them to gain attention. The females, called peahens, choose mates according to the size and color of their feathers.

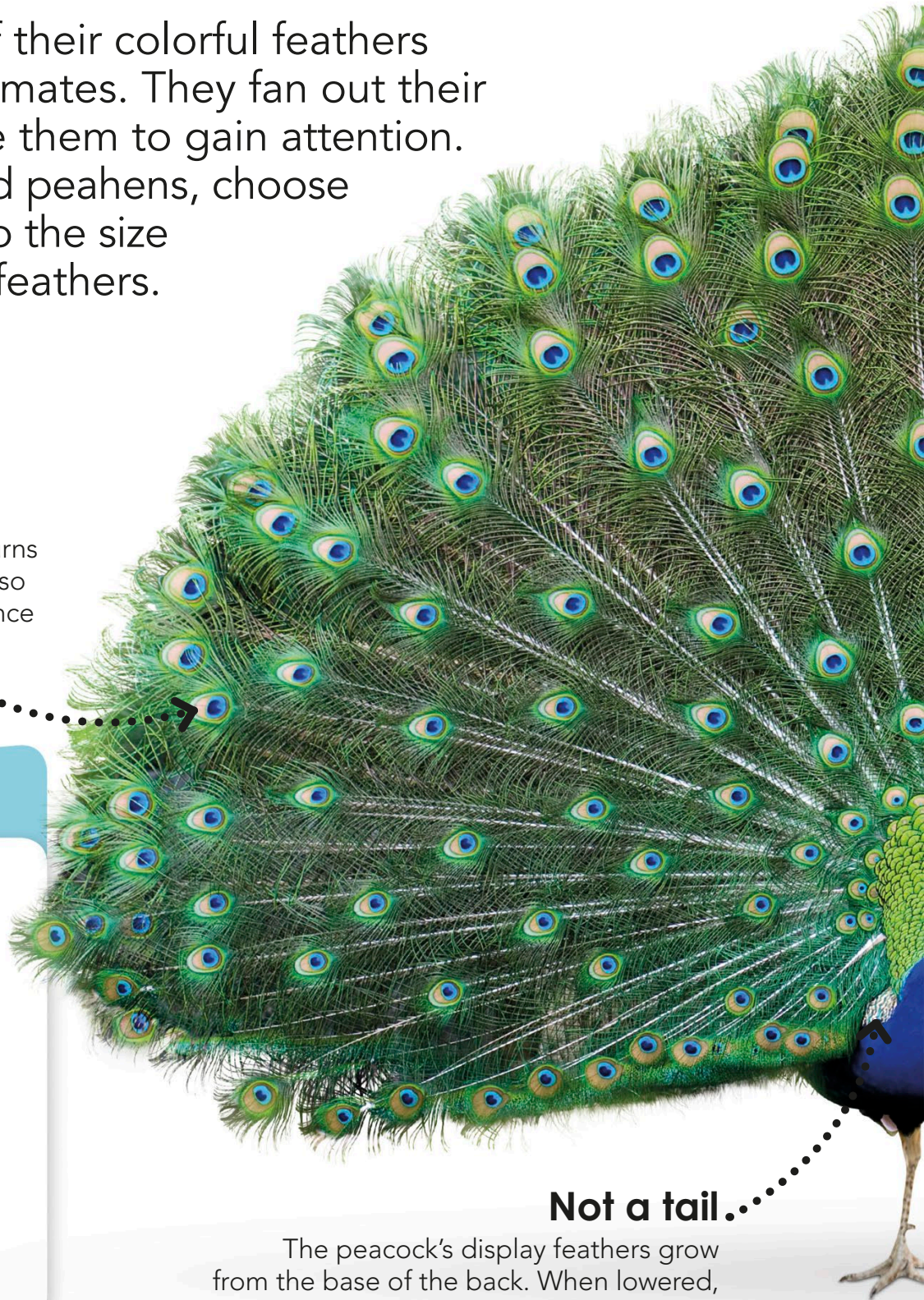
## Spots like eyes

The blue-green spots, or "eyes," grab the female's attention. The peacock turns them toward the peahen so that he has a greater chance of impressing her.

## ? Quick quiz

- Which is the closest relative of peacocks?
  - Bird of paradise
  - Pheasant
  - Ostrich
- Which is the most likely predator of a peacock in the wild?
  - Tiger
  - Lion
  - Crocodile

See pages 134–135 for the answers

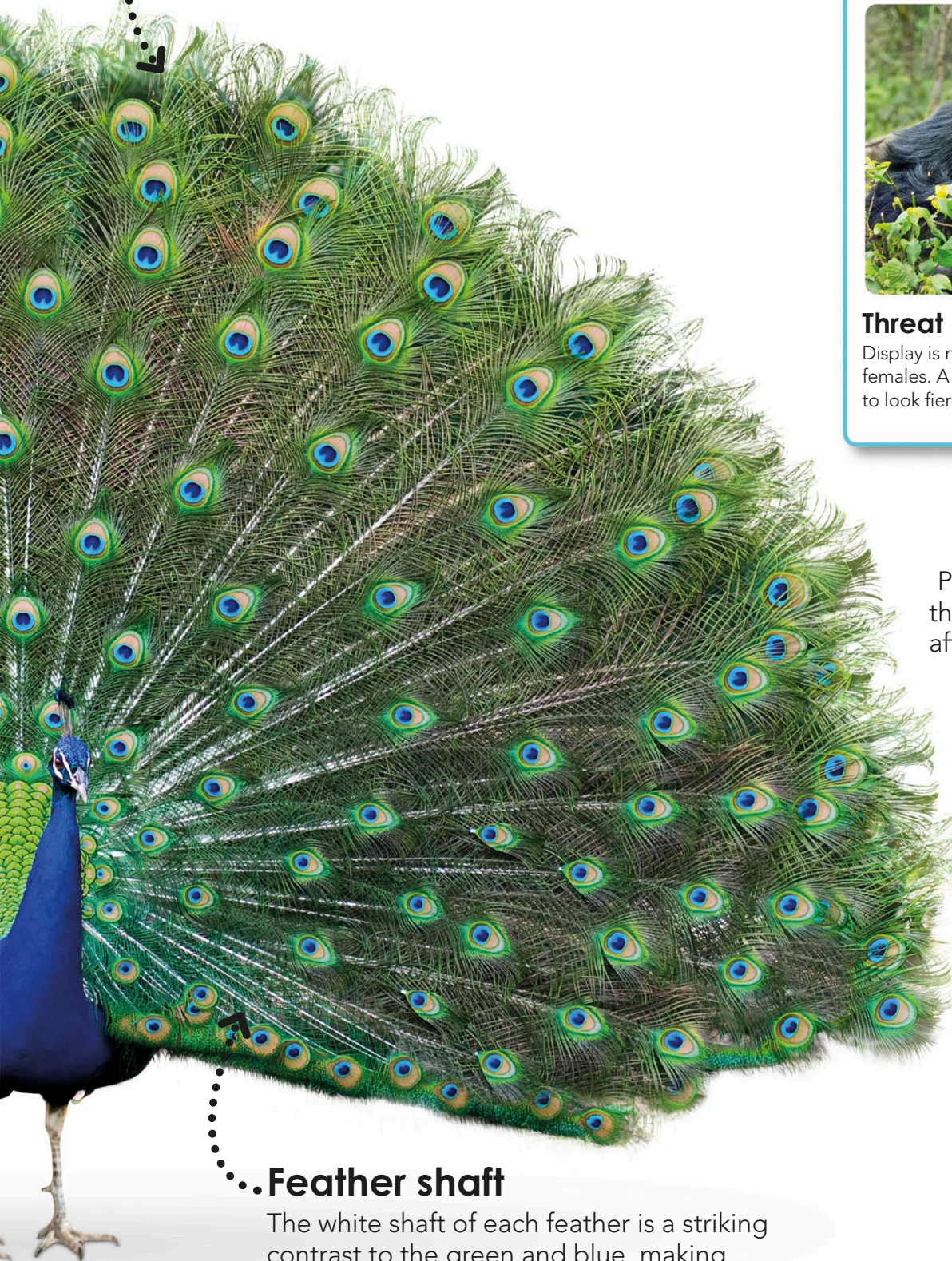


## Not a tail...

The peacock's display feathers grow from the base of the back. When lowered, these feathers sit on top of the bird's tail.

## Huge display

There are about 100–150 feathers, and each can be up to 6½ ft (2 m) long. These make up more than half of a peacock's length.



## Feather shaft

The white shaft of each feather is a striking contrast to the green and blue, making the bright colors stand out more.

## Why do gorillas beat their chests?

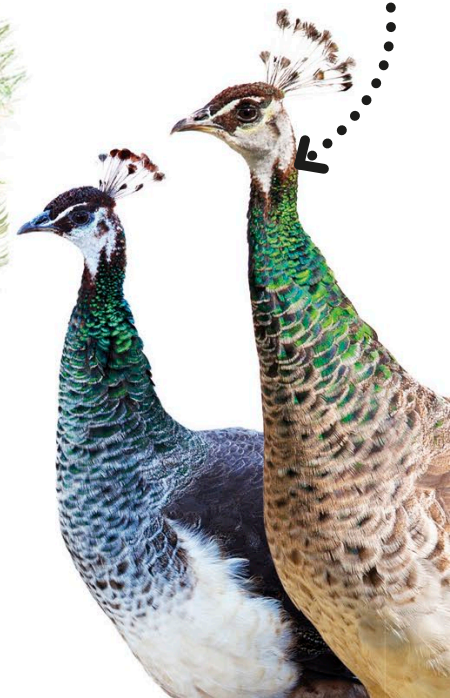


### Threat display

Display is not all about males impressing females. A male gorilla thumps his chest to look fierce and scare intruders away.

## Blending in

Peahens are less colorful than peacocks. They look after the eggs and young, and because of their dull colors, they don't attract predators.



### Frequent flyer

Long, pointed wings help to make the tiny Arctic tern a super-efficient flier, so it can cover long distances with ease. ....

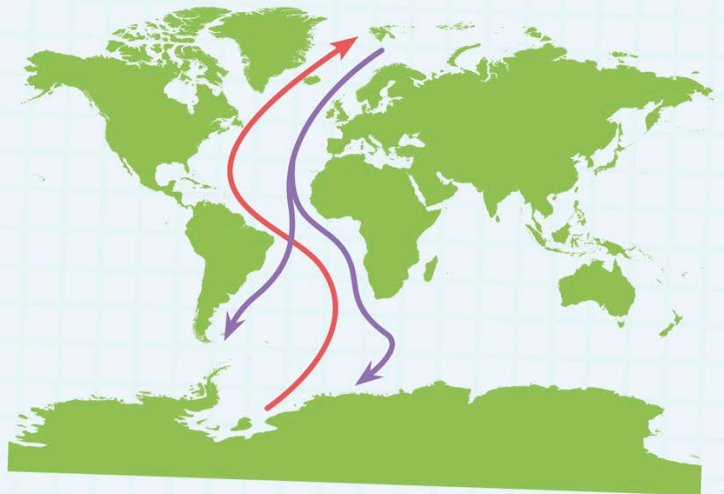


## Why do birds migrate?

Many birds fly long distances every year to places with more food in winter and good breeding spots in summer. This is called migration. Arctic terns make the longest migration in the animal world, flying from the Arctic to Antarctica and back again every year.

### Migration route

Arctic terns fly south from the Arctic during fall, reaching Antarctica when it is summer there. They fly back north once it is fall in Antarctica.



- Route from the Arctic to Antarctica
- Route from Antarctica to the Arctic

### Breeding in the north

Terns raise their young in the Arctic summer, from May to August, when there's lots of food available to feed the chicks.



### Resting in the south

From November to February, Arctic terns rest in Antarctica, where it is summer and there is plenty of fish.

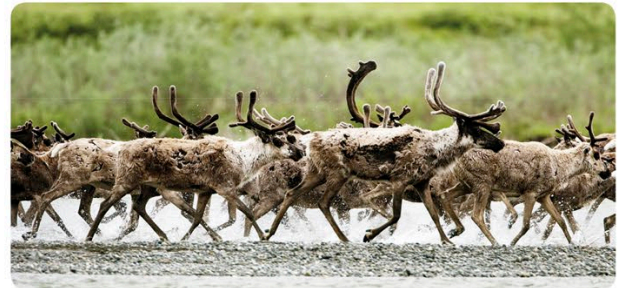


## Do any other animals migrate?



### Monarch butterfly

In the fall, these American butterflies migrate thousands of miles southward to warmer places, where they hibernate (remain inactive) over the winter.



### Caribou

Big herds of American reindeer, called caribou, travel about 3,000 miles (5,000 km) each year. This is the longest overland migration of any animal.

## ..Long journey

On average, an Arctic tern flies at least the same distance as a trip to the Moon and back in its lifetime.

## ? Quick quiz

1. Why do some birds migrate but others don't?
2. Does migration only involve moving north and south?
3. Do migrations always take place in different seasons?

See pages 134–135 for the answers

## ..Fueled by fish

The Arctic tern's energy comes from eating fish. As the bird flies southward toward Antarctica, it dives for fish near coasts. Strong winds help make the northward journey back to the Arctic quicker.

# Why don't sleeping birds fall off their perches?

Surprisingly, a treetop perch is a perfectly safe spot for a bird to fall asleep on. When it sits on a branch, its toes automatically curl and lock around it. Even when it is dozing, it never loses its grip.

## ? Picture quiz



Which bird can go to sleep even while it is flying?

See pages 134–135 for the answer

## Sleepy eyes

Birds can sleep with one eye open, and with one half of their brain alert, while the other half rests.

## Fluffy feathers

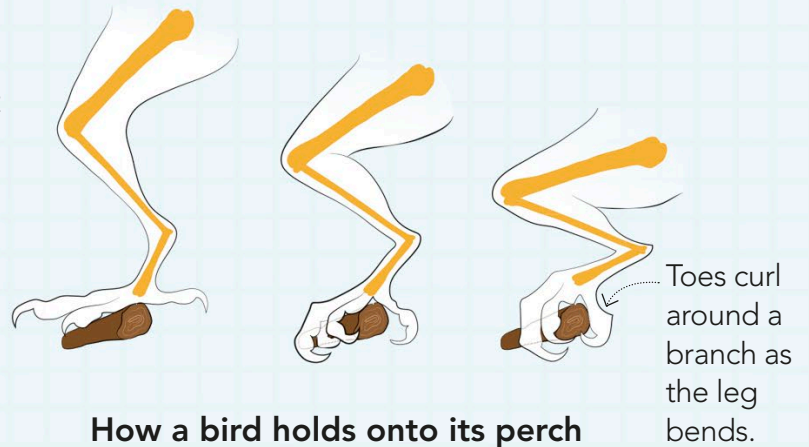
Some birds fluff up their feathers while sleeping to keep their bodies warm.





## Foot-locking mechanism

When a bird bends its legs to sit on a branch, tendons—parts of the body that join muscles to bones—automatically pull and lock the toes into a curled position. As long as the leg remains bent, the toes stay locked.



How a bird holds onto its perch



## How do horses sleep?



### Standing

By locking their knees, horses can sleep while standing up. Many large mammals do this so they can quickly escape if danger is nearby.

## • Curling toes

Most perching birds have three toes pointing forward and one backward. However, parrots, such as these conures from South America, have two front-facing and two back-facing toes.

# Which bird builds the best nest?

Birds are expert nest-builders, weaving together plant stalks and grass blades to make cups or baskets in which they lay their eggs. Male baya weavers, from Asia, use their strong beaks to make one of the most impressive nests.

## Nest to impress

The male baya weaver uses his expert weaving skills to encourage a passing female to choose his nest for her eggs.



## Anchored

Baya weavers hang their nests from branches to keep them away from predators that might steal the eggs and young.

## ? Quick quiz

1. Which bird builds the smallest nest?
2. Do all birds build nests?
3. Which other animals build nests?

See pages 134–135 for the answers



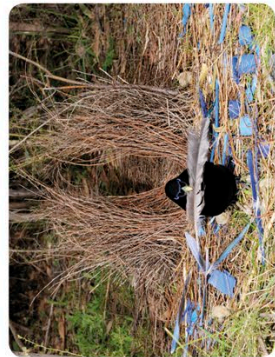
### :Finishing touches

If a female likes the nest, she will join the male and help build the entrance tunnel.

### Cozy corner

The female lines the nest chamber with feathers to make a softer base for her eggs and young.

## What else do birds build?



### Bower for mating

In Australia, a male bowerbird builds an arrangement of grass and stems called a bower to win a mate. He uses colorful objects as finishing touches and then waits for a female to pass by. If she is impressed, she mates with him.



### Clay nests

A swallow scoops mouthfuls of mud and shapes it into a cup, which then hardens into a solid nest. Nests usually hang from a wall or a roof.

# Why don't penguins freeze in the snow?

In Antarctica, the world's coldest place, your toes could freeze solid at any moment. Emperor penguins have adapted to survive the icy conditions. They huddle together for warmth and are protected by thick, feathery coats.

## Group huddle

Emperor penguins and their chicks stand in a huddle to try to stop their body heat from escaping. They face inward, away from the icy winds, and take turns standing at the edge.

## Wind barriers

Breeding colonies of penguins sometimes shelter from chilly winds behind ice cliffs.

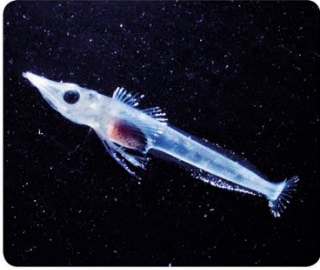
## ? True or false?

1. The emperor penguin is the world's biggest penguin.
2. The emperor penguin is the only bird to breed in Antarctica.

See pages 134–135 for the answers



## Which other animals can fight the frost?



### Crocodile icefish

In the freezing Antarctic Ocean, the crocodile icefish stays alive by having special blood. It contains a chemical that stops ice crystals from forming in the fish's body.



### Wood frog

The North American wood frog freezes most of its body during winters to survive the extreme cold. It thaws to its normal state in warmer weather.

## Keeping warm

Dense feathers and an extra-thick layer of fat under the skin help to trap body heat. Feathers also repel water easily, keeping the penguin dry.



During the 2 months a male emperor penguin keeps the egg warm, he doesn't eat anything.

## Cold feet

Penguins sometimes lean back onto their stiff tails so that their feet don't touch the frozen ground. This helps to reduce the loss of body heat.





## What eats eagles?

The biggest kinds of eagles, such as the bald eagle from North America, are so strong and quick that they are at the top of their food chain. This means that there's nothing else that can kill and eat them.

### • Eyes

The bald eagle has excellent vision. It can focus on a fish in the water even when flying 1,000 ft (300 m) above the surface.

## Which other animals are top predators?



### Grizzly bear

The grizzly bear, from North America, is one of the biggest of all land predators. It mostly eats nuts, berries, and fruit, but also preys on rodents and bigger animals, such as deer. The males usually live by themselves, but may gather to feast on fish.



### Anaconda

The world's heaviest snake, the anaconda, kills animals the size of small pigs by squeezing them so tight they cannot breathe, before swallowing them whole. It lives in South America, where its diet includes small deer, birds, and turtles.



### ...Tail feathers

Big tail feathers help to control movement as the eagle swoops down to catch prey.

### Talons

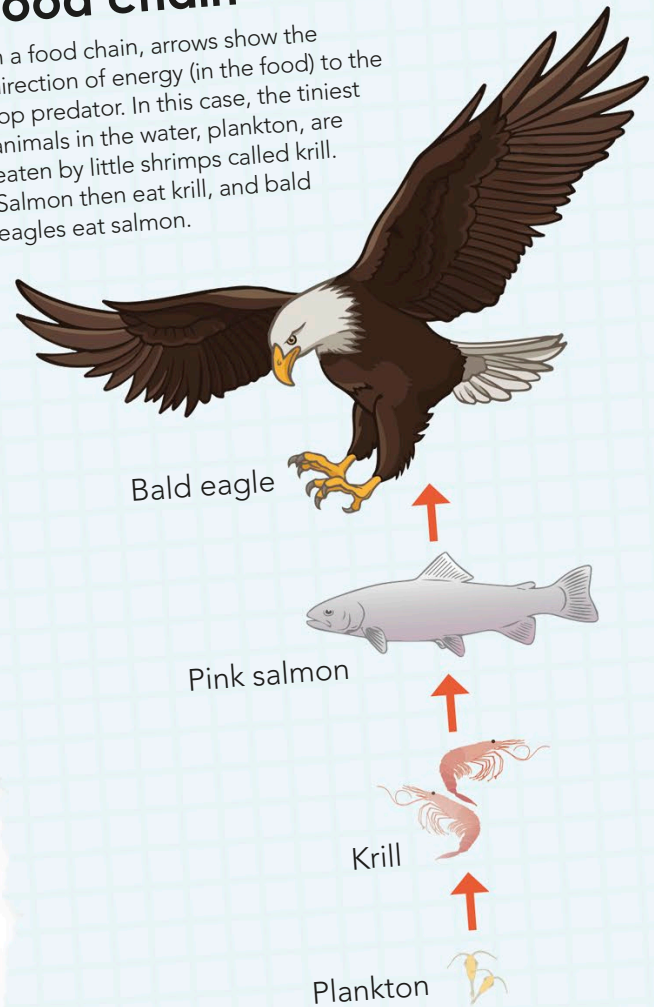
An eagle's feet have long, curved talons that give them a strong grip for grasping big, slippery fish.

### Diet

Big eagles are strong enough to prey on animals the size of a small deer, but a bald eagle's most common prey is fish.

## Food chain

In a food chain, arrows show the direction of energy (in the food) to the top predator. In this case, the tiniest animals in the water, plankton, are eaten by little shrimps called krill. Salmon then eat krill, and bald eagles eat salmon.



## ? Quick quiz

- An eagle kills its prey by...
  - biting it with its sharp beak
  - gripping it with its talons
  - dropping it to the ground
- What is the weight of a bald eagle's nest?
  - The weight of a rabbit
  - The weight of a grown man
  - The weight of a small car

See pages 134–135 for the answers

# Why don't woodpeckers get a headache?

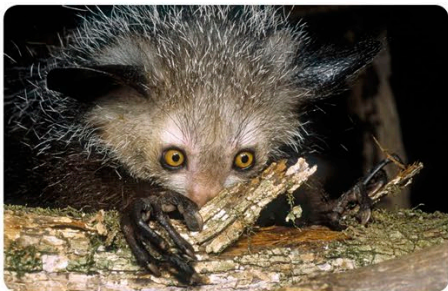
A woodpecker can hammer its beak against a tree trunk 12,000 times a day looking for insects to eat, and not hurt its head. That's because its brain is held snugly inside a skull made of special bone that cushions it from the blows.

## How do other animals get food from tree trunks?



### Twigs for tools

The woodpecker finch is one of the few birds that uses a tool: it pokes a twig into holes in tree bark to pull out tasty insects.



### Finger food

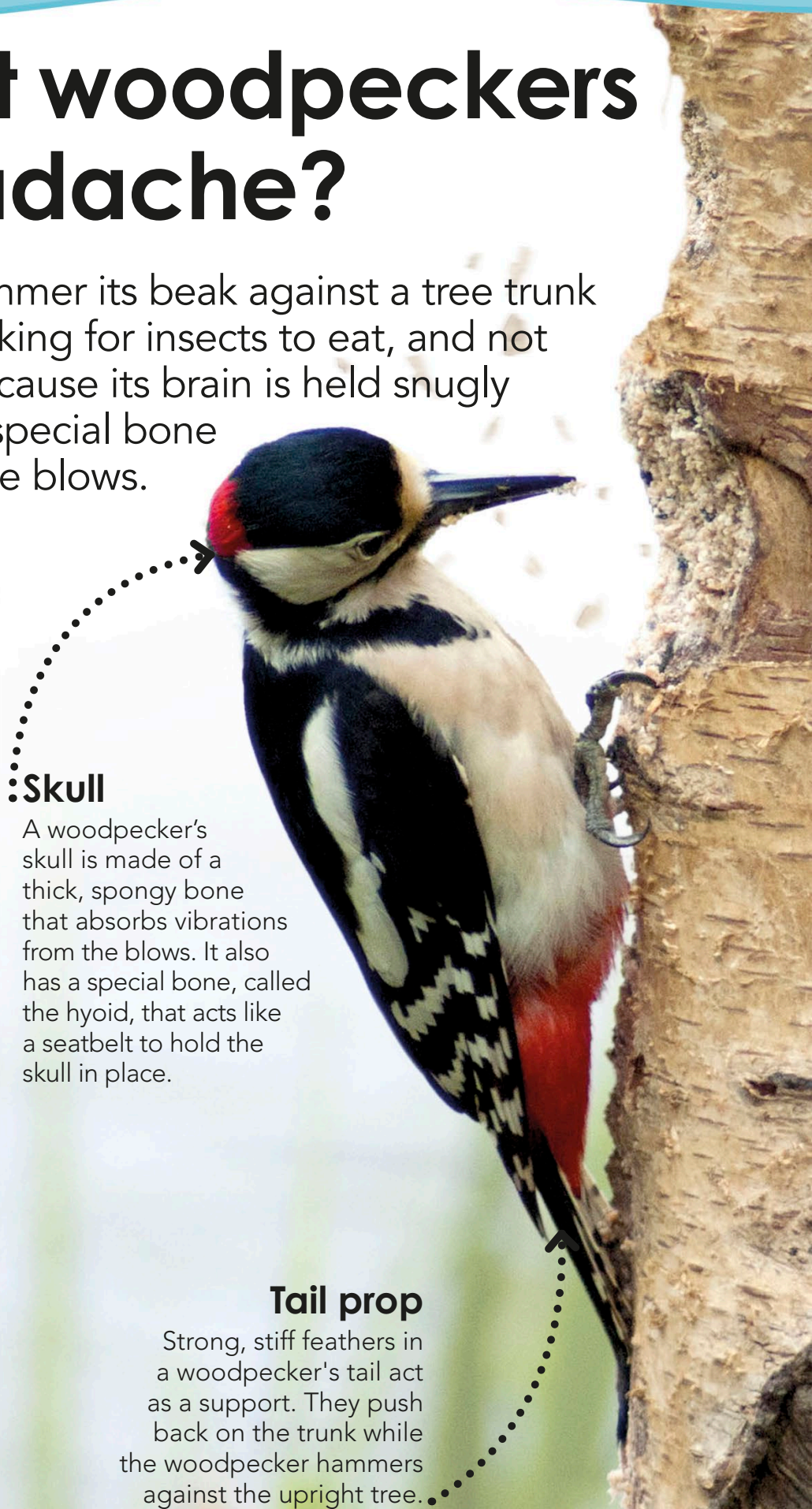
The aye-aye, from Madagascar, taps on a branch, listens for grubs inside, and then uses its finger to scoop them out.

## Skull

A woodpecker's skull is made of a thick, spongy bone that absorbs vibrations from the blows. It also has a special bone, called the hyoid, that acts like a seatbelt to hold the skull in place.

## Tail prop

Strong, stiff feathers in a woodpecker's tail act as a support. They push back on the trunk while the woodpecker hammers against the upright tree.





## Beak

The beak is strong enough for hammering—and its tip can even carry on repairing itself so it doesn't get worn down.

A woodpecker can hit a tree trunk 20 times per second.

## ..Claws

A woodpecker has clawed toes—two facing forward and two facing backward. These help it get a firm grip on the trunk.

## ? True or false?

1. Woodpeckers can even make holes in concrete.
2. Woodpeckers drum on trees to communicate.
3. Woodpeckers make holes in trees for nests.

See pages 134–135 for the answers





# Underwater

The world's oceans, lakes, and rivers are home to many different animals. Most have gills to breathe in water but some, such as dolphins, have to come to the surface for air.

# Why do jellyfish glow?

Like many other animals of the deep sea, some kinds of jellyfish, such as this mauve stinger, can produce light—perhaps as a way of avoiding being eaten. A soft, juicy jellyfish is a tasty meal for some animals, but a bright flash might dazzle or frighten a hunter.

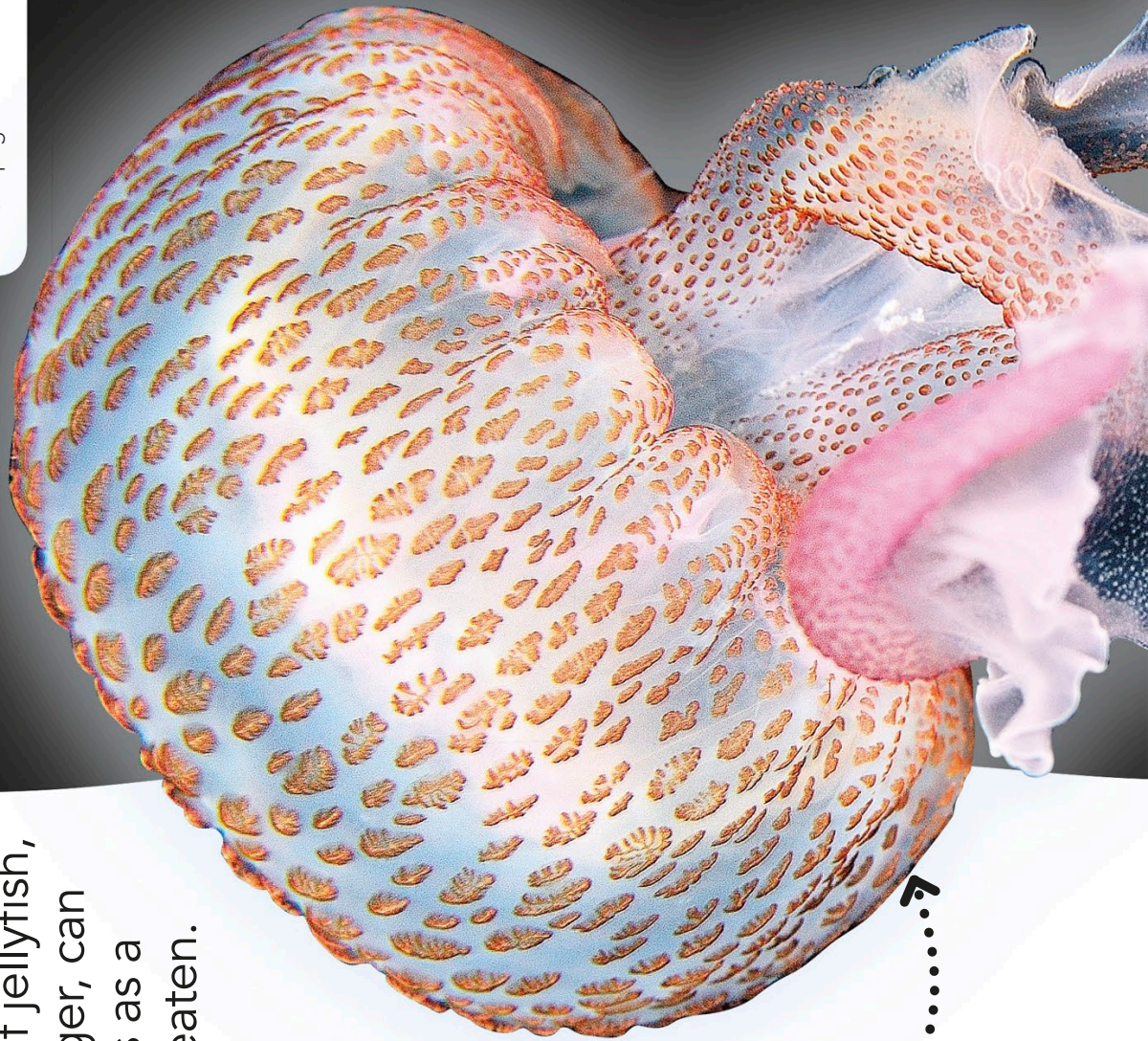
## Glow in the dark

This jellyfish produces light because of a type of chemical reaction that takes place in its body.

## ? True or false?

1. Some deep-sea fish produce light.
2. Some rabbits can glow.

See pages 134–135 for the answers



## Deadly stingers

Jellyfish have stinging cells in their tentacles that they use to paralyze their prey.....



## Wiggly tentacles

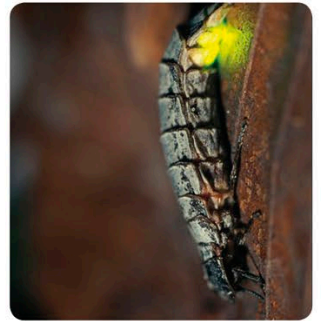
The tentacles also glow. They are packed with muscle to catch prey and transfer it to the mouth inside the bell.....



## Which other animals glow in the dark?

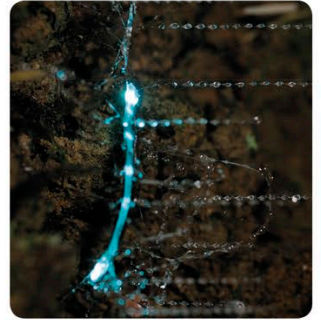
### Glowworm beetle

These beetles flash light from their rear end. They use flashes to communicate with one another when they are searching for mates.



### Fungus gnats

Flying insects are attracted to light. The predatory young of the cave-dwelling fungus gnat produce glowing threads of slime to ensnare prey.



# Do fish sleep?

Fish sleep, but because they don't have eyelids, it can be difficult to tell if they are dozing or awake. However, a sleeping parrotfish is easy to spot because it builds a slimy cocoon around itself to sleep in.

## Slime blanket

Every night, the parrotfish makes a protective blanket of slime to sleep inside. It produces the slime from its mouth.

The parrotfish takes up to an hour to build its cocoon.

## Safe cocoon

The cocoon is a protective shield against bites from bugs, such as fish lice. This may be because it hides the smell of the fish.

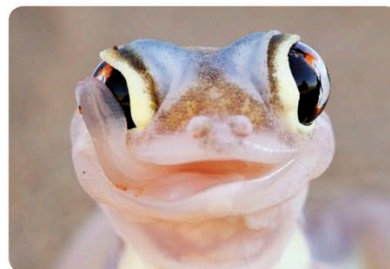


## Which animals have unusual eyes?



### Chameleon

Most reptiles, such as chameleons, have eyelids that are attached to the pupils. When a chameleon moves an eye, the eyelid moves with it.



### Gecko

Like most geckos, a Namib sand gecko does not have eyelids. It keeps its eyes clean by licking them with its long tongue.



## Quick quiz

1. Do all parrotfish build a nighttime cocoon?
2. Do all fish sleep at night?

See pages 134–135 for the answers



### • Predator alarm

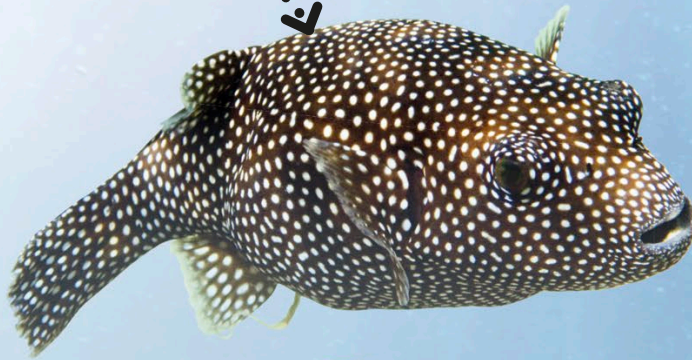
The slimy blanket may also act as an early warning system against predators. The fish gets time to swim away when predators, such as moray eels, disturb the cocoon.

# How do pufferfish puff up?

For a fish that is a mouth-sized snack for a bigger fish, a good way to defend yourself is to get bigger. The pufferfish does just that, by swallowing water. Some are also poisonous.

## Small and slow

Pufferfish are slow and clumsy swimmers, and when deflated, like this one, can be quite small. This makes them an easy target for predators. ....



## Quick quiz

1. Do pufferfish have teeth?
2. How do baby pufferfish defend themselves?
3. How does a pufferfish deflate?

See pages 134–135 for the answers

## Split-proof

A pufferfish's skin is tough and stretchy, so it doesn't split when the fish puffs up. Its stomach has folded walls, which allow it to expand. ....



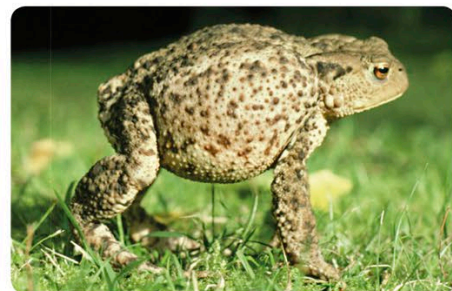
## More than a mouthful

An inflated pufferfish not only looks scary, but is also too big to fit in the mouth of many predators.

This is important because it swims twice as slowly when puffed up.

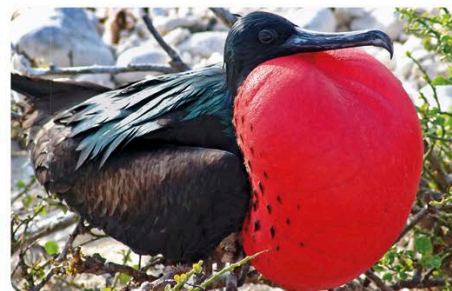
A single pufferfish has enough poison to kill 30 adult humans.

## Which other animals huff and puff?



### Toad

If a toad feels threatened, it gulps extra air into its lungs and stretches its legs to appear bigger and scarier.



### Frigate bird

Male frigate birds puff up their bright red throat pouch, just like a balloon, to impress females.

# Can flying fish really fly?

Flying fish soar above water on their wide fins, which makes them look like they are flying. They pick up speed underwater and then jump above the surface to escape predators. However, since they can't flap their fins, they glide rather than actually fly.

## Folded down

The flying fish keeps its side fins in a folded position until it breaks the surface. The fins then expand into gliders. . . .

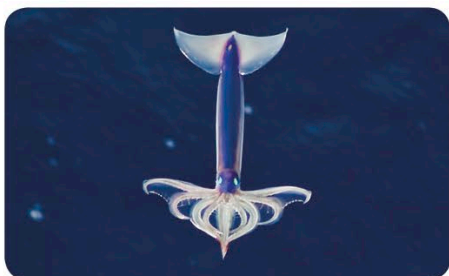


## Leaping to safety

A flying fish has so much power in its muscles that it can leap about 20 ft (6 m) into the air. . . .



## ? Picture quiz



Which squid can glide above the surface of the water?

See pages 134–135 for the answer

## Speedy tail

The forked tailfin quivers up to 70 times a second to launch the flying fish out of the water.

## Stiff body

The torpedo-shaped body is held straight, making it easier for the fish to glide through the air. It can stay in the air for up to 45 seconds.

## Fins for wings

The fish opens its front side fins to use like wings. Some flying fish have extra-big rear fins, too.

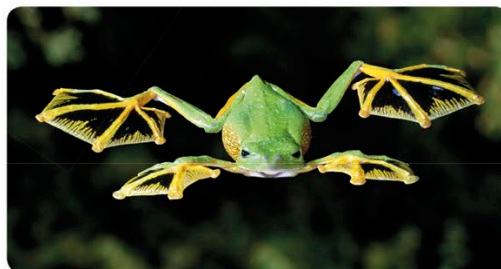
A flying fish can glide up to 45 mph (70 kph) through the air.

## Which other animals seem to fly?



### Flying squirrel

This animal has furry skin that stretches from its wrists to its ankles. This works like a parachute as the squirrel glides from one tree to another.



### Flying frog

While most frogs are experts at the long jump, Wallace's flying frog can glide from trees using its broad webbed feet.



A hammerhead has up to 3,000 sensory pores on its head.

## How do sharks find prey?

Some sharks are good at sensing blood in the water, but all of them have an even smarter method for tracking prey. Using special sensors, they can detect the tiny electrical signals inside an animal's working muscles and nerves.

### ? True or false?

1. All sharks are man-eaters.
2. Sharks keep producing new teeth during their lifetime.

See pages 134–135 for the answers

## Wide-eyed wonder

The hammerhead's eyes are placed far apart, on the tips of the "hammer." This gives the shark a 360° view around it.



## Buried prey

Hammerhead sharks often snack on stingrays, which hide by burying themselves in the sand. A shark finds them by using its "hammer" like a metal detector to scan the bottom.



## Can any animal use electricity to shock?



### Torpedo ray

The torpedo ray's flat body is packed with organs that can generate an electric shock to keep away predators.



### Electric eel

Although all animals produce electricity in their muscles and nerves, the electric eel can produce bigger electric shocks to stun prey.

## Hammerhead

The hammerhead shark's strange-looking head is packed with tiny sensors along its front edge. These detect electrical activity from prey.



# Is coral alive?

Coral might look like colorful rocks, but, in fact, it's a colony (group) of tiny living animals called polyps. During the day, the coral looks lifeless. At night, however, thousands of polyps stretch out their tentacles to catch and feed on little animals drifting in the water.

## Coral reef

A coral reef's surface is peppered with thousands of polyps. They are rooted to a fixed spot, but can still wave their tentacles.



## Quick quiz

1. How does coral sting?
2. What is a coral reef?

See pages 134–135 for the answers

## Single polyp

An open polyp looks like an anemone. A ring of stinging tentacles catch and paralyze small prey, then moves it to the mouth at the center.



## Rocky skeleton

Much of the coral is made of hard, rocky skeleton, which protects the soft parts of the animals inside.



## Which other animals look lifeless?



### Stonefish

This fish looks like a lump of rock, but the spines on its back can give you a terrible sting.



### Sea sponges

Sponges also live in a colony, but don't have tentacles. If they are broken apart, the bits can even group back together.

# Why do dolphins have blowholes?

Just like us, a dolphin must breathe air with its lungs, even though it spends its life swimming in water. It uses a blowhole to inhale air at the surface, and then holds its breath when it goes underwater.



## Quick quiz

- Which other marine mammal uses a blowhole?
  - Whale
  - Seal
  - Sea otter
- How high can dolphins leap into the air?
  - 10 ft (3 m)
  - 15 ft (4.5 m)
  - 20 ft (6 m)

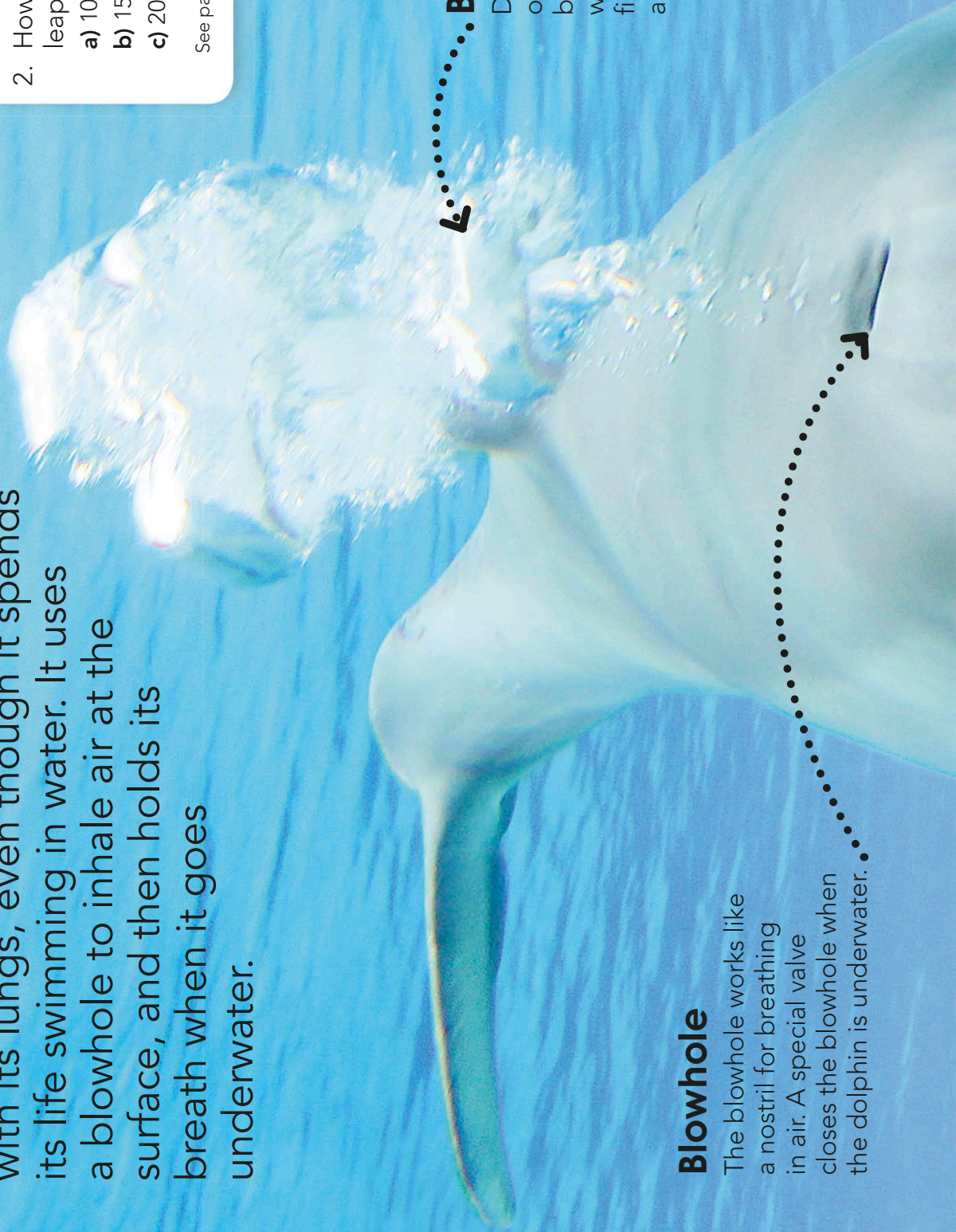
See pages 134–135 for the answers

### Blowhole

The blowhole works like a nostril for breathing in air. A special valve closes the blowhole when the dolphin is underwater.

### Blowing bubbles

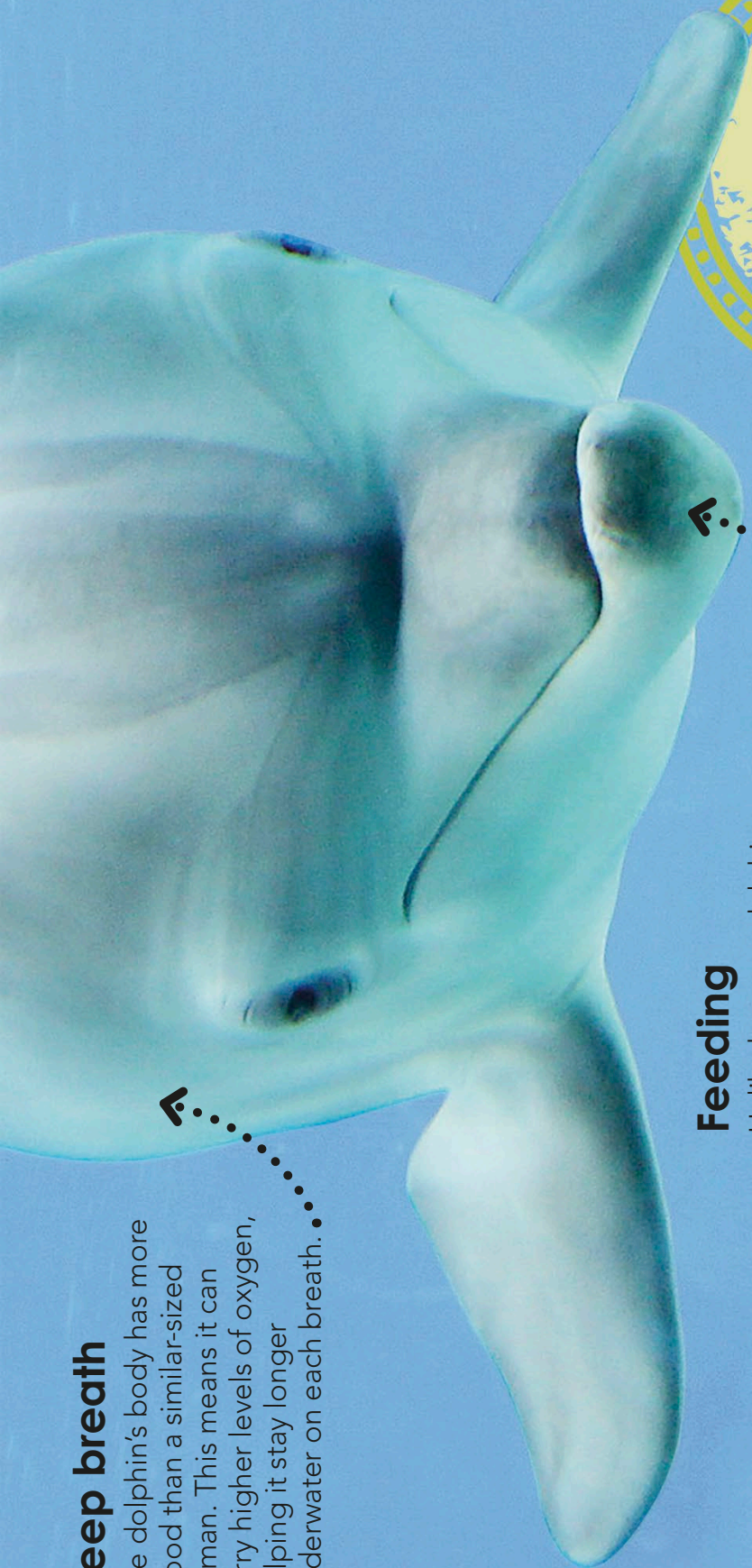
Dolphins blow streams of bubbles from their blowholes. They do this while hunting to confuse fish by clouding the water and making it hard to see.





## Deep breath

The dolphin's body has more blood than a similar-sized human. This means it can carry higher levels of oxygen, helping it stay longer underwater on each breath.



## Feeding

Unlike humans, dolphins never breathe through their mouths. They have separate paths for food and air so that their lungs don't flood with water while they are eating.

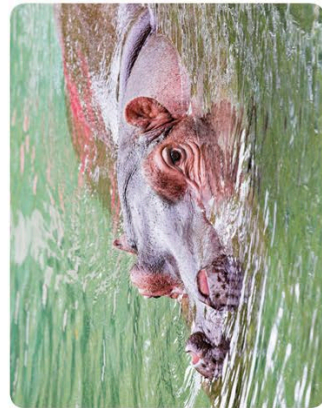
Dolphins can usually hold their breath for about 3 to 7 minutes.

## How do other air-breathing animals breathe in water?



### Air bubbles

The water spider is the only spider that hunts underwater. It keeps breathing by creating a silk-lined bubble of air, a bit like how a deep-sea diver carries a tank of oxygen.



### Uprturned noses

Hippopotamuses have their nostrils high on their heads. This allows them to keep breathing even if most of their body is underwater.

# What animals live in the deep sea?

More than 3,000 ft (1,000 m) below the surface, the ocean is bitterly cold and pitch black. Many strange deep-sea creatures are perfectly suited to make this harsh place their home.

## Dumbo octopus

Unlike other octopuses, the dumbo octopus has earlike flaps that help it swim. It lives about 10,000 ft (3,000 m) below the ocean's surface.



## ? Quick quiz

1. Which animal lives deepest in the ocean?
2. How do scientists know what lives in the deep sea?

See pages 134–135 for the answers

## Fangtooth

This fish has teeth so big that it cannot completely close its jaws. It grabs prey with the fangs and swallows the fish whole.



## Which animals can survive extremely hot conditions?



### Giant kangaroo rat

Some animals that live in hot, dry grasslands—such as the giant kangaroo rat from California, USA—can survive in this tough environment without having a drop of water to drink. It gets all the water it needs from its food.



### Saharan ant

Most animals would die in places where the ground is hot enough to cook an egg on. However, this desert ant can scamper between its burrows over sand that's more than 120°F (50°C) in the burning sun.

## Anglerfish

The female anglerfish uses a glowing lantern on her head to attract other fish. They swim toward to the light, and are quickly gulped up.

## Pelican eel

Food is hard to find in the deep sea. To survive, this fish uses its enormous jaws to scoop up schools of prey, such as shrimp, all at once.



# Why don't clownfish get stung by sea anemones?

A stinging sea anemone might seem like a strange place to set up home, but clownfish have an extra-slimy coating for protection. Living in the anemone keeps the clownfish safe from predators. In return, the fish keep the anemone clean and drive away its enemies.

## Slimy skin

All fish are covered in slime, but it is three times as thick on a clownfish. This protects it from the venomous sting of the anemone. ....

## Enemies

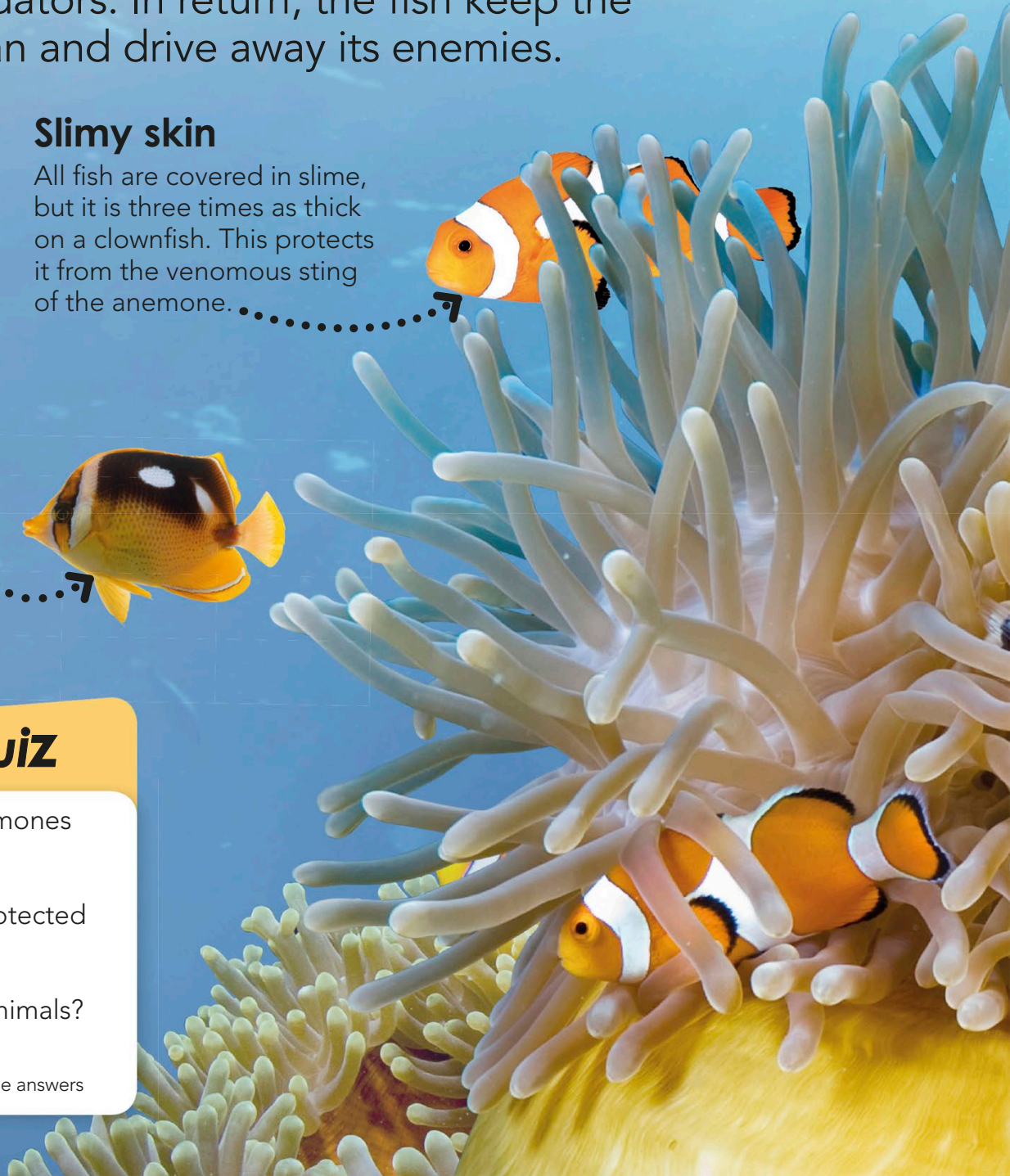
Clownfish are protective of their anemone home. They will chase away other kinds of fish, such as the butterfly fish, which eat anemones. ....



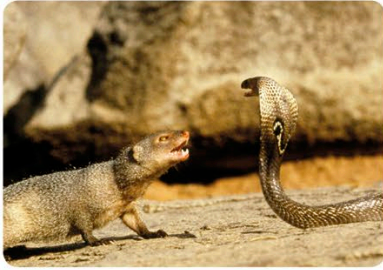
## ? Quick quiz

1. Why do sea anemones sting?
2. Are other fish protected by slime?
3. Are anemones animals?

See pages 134–135 for the answers

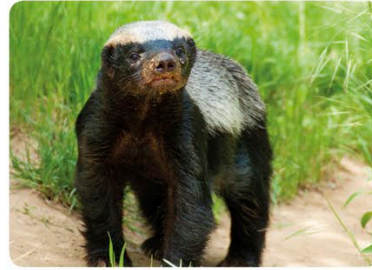


## Which other animals can resist venom?



### Mongoose

A cobra's bite is usually enough to kill a small animal. However, the mongoose—a type of mammal—is unaffected by the cobra's venom so ends up with snake for dinner.



### Honey badger

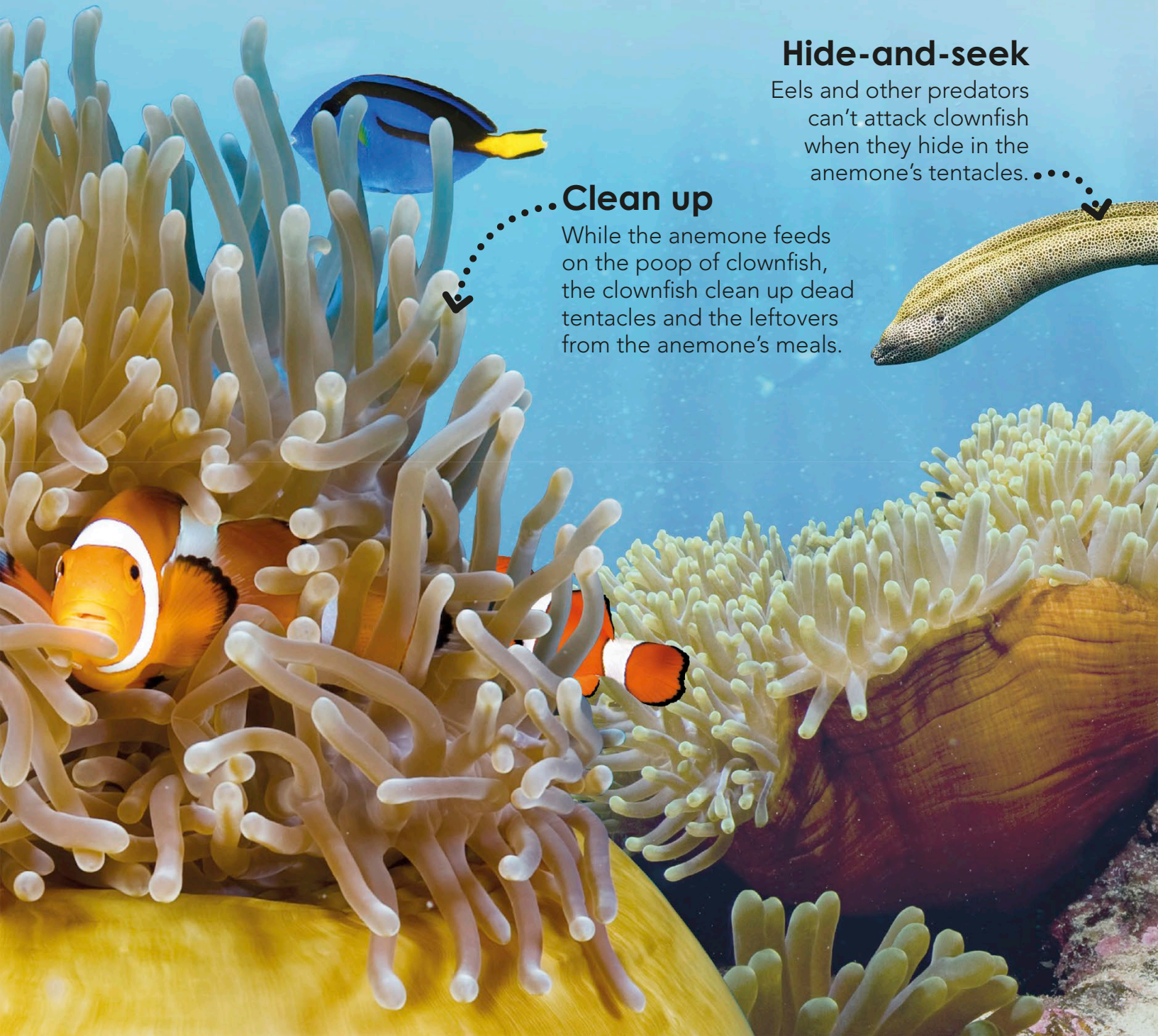
You must get past angry bees to steal honey from a bee's nest. But a honey badger has such thick skin that it isn't bothered by the bees' stings.

## Hide-and-seek

Eels and other predators can't attack clownfish when they hide in the anemone's tentacles. . . .

### Clean up

While the anemone feeds on the poop of clownfish, the clownfish clean up dead tentacles and the leftovers from the anemone's meals.



# Why do crabs walk sideways?

We walk forward because our knees bend at the front. But most crabs have wide shells that make their leg joints point toward the side instead. This means they find it easier to walk sideways.

## Bendy joints

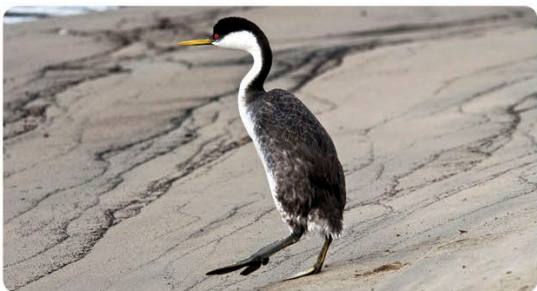
Crabs have several joints in each leg. Each can bend, like our knees, making the legs extra flexible.

## Which other animals have funny walks?



### Batfish

Batfish have flat bodies shaped like tennis rackets. They use their flaplike fins for walking slowly on the seabed.



### Grebes

A grebe's feet are positioned far back on its body. This makes them good for paddling in the water, but on land they make this bird walk awkwardly.

Some crabs have "teeth" inside their stomachs to help break down food.



## Watchful eyes

This ghost crab has especially big eyes for spotting danger, so it can get ready to run.

## Legs on the side

A crab has four pairs of legs attached to the side of its body, and two claws in front, facing forward.

## ? Picture quiz



Which snake moves sideways by making S-shaped curves?

See pages 134–135 for the answer

## Sand lines

As a crab scurries sideways over sand, its feet make lines that run alongside one another.

# Are piranhas bloodthirsty?

Piranhas have razor-sharp teeth for eating meat. Many stories describe them as very aggressive fish that attack in large groups and will tear any creature to pieces, including humans. However, piranhas actually prefer to prey on other fish and they probably gather in groups for safety, not to hunt and kill.

## ? True or false?

1. Piranhas live in South America.
2. All types of piranhas only eat meat.
3. Piranhas are most active at night.

See pages 134–135 for the answers

## Power bite

In addition to having sharp teeth, piranhas have extra-strong jaws—giving them a dangerous bite.



## Which animals are actually bloodthirsty?



### Vampire bat

This bat uses its sharp teeth to make a cut in its victim's skin. Then, it laps up the blood that flows from the wound. It has a heat sensor on its nose that helps it locate the spot from where the victim's warm blood flows.



### Lamprey

Instead of biting jaws, this fish has a circular mouth ringed with teeth. The mouth clamps onto another fish's body and sucks out the blood.





### ...Racing ahead

Like most fish, a piranha gets much of its swimming power from beating its tail from side to side.

A piranha can bite right through the finger of a careless fisherman.

### Safety in numbers.

Piranhas stay in large groups called "schools." This protects them from enemies because predators find it difficult to single out a victim from a big group.



**Breathing**

Whales, like these sperm whales, must come up to the surface for air, where they may be harmed by colliding with ships.

**Wrong signals**

Signals from submarines can interfere with the communication between whales, stopping them from diving or feeding.

**Diving to eat**

Sperm whales can dive more than 1.2 miles (2 km) down—deeper than almost any other kind of mammal. Here, they hunt for their favorite prey, deep-water squid.

At their peak, in around 1950, whaling ships killed 25,000 sperm whales per year.

# How many whales are there in the ocean?

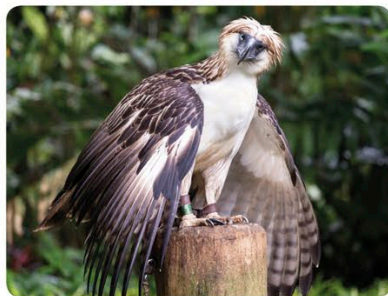
The world's oceans are home to many different types of whale, but hunting by humans means there are fewer whales alive today than a century ago. Many species are endangered, which means they could soon die out completely. There are hundreds of thousands of sperm whales, but perhaps only 10,000 blue whales left in the ocean.

## Why do animals become endangered?



### Hunting

If animals are hunted by humans faster than they can breed, their numbers decline. Black rhinos have nearly been wiped out because they are killed for their horns.



### Loss of home

The Philippine eagle lives in rain forests, but deforestation (cutting down forests) has reduced the number of places where it can live and find food.



## Quick quiz

1. What is the rarest kind of whale?
  - a) Bowhead whale
  - b) Spade-toothed whale
  - c) Humpback whale
2. Why do humans hunt whales?
  - a) For their meat, oil, and blubber
  - b) For sport
  - c) To clear the way for ships

See pages 134–135 for the answers

## Endangered species

These are some of the endangered whales.



Blue whale



Fin whale



North Atlantic right whale



North Pacific right whale



Sei whale





# Creepy-crawlies

Animals without a backbone, such as insects, spiders, and snails, are called invertebrates. There are more kinds of creepy-crawly in the world than any other type of animal.

# Why don't pond skaters sink?

While other insects usually drown in water, pond skaters dart easily across the surface. Special foot pads with waxy hairs stop them from sinking. The pond skater's feet dent the water's surface, but the waterproof hairs keep them dry.

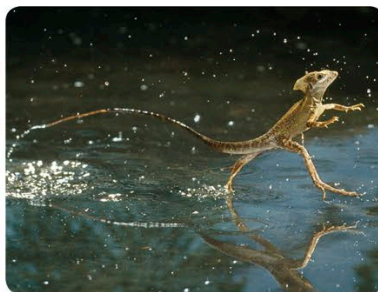
A close-up photograph of a pond skater insect on a water surface. The insect is dark brown with long, thin legs. Its body is elongated and segmented. The water surface is rippled, and the insect's legs are visible as they touch the water. A circular callout box with a blue border and a white background is positioned in the lower-left quadrant of the image. The text inside the callout box is black and reads: "The skater's sensitive feet pick up the vibrations of drowning insects for it to eat." The background is a soft, out-of-focus yellowish-brown, suggesting a natural pond environment.

The skater's sensitive feet pick up the vibrations of drowning insects for it to eat.

## Back legs

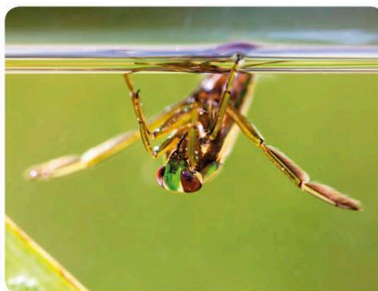
As the pond skater skims over the water, it uses its back legs like rudders to make high-speed turns when chasing prey.

## Which other animals can move across the water's surface?



### Sprinting above

This basilisk lizard, from Central and South America, is probably the heaviest animal that can walk on water. Its feet cup bubbles of air to keep it afloat, but it needs to run fast to prevent itself from sinking.



### Hanging below

The surface "skin" of water can support tiny animals underneath the water, as well as above it. The predatory backswimmer hugs the skin while it reloads a store of air it keeps under its wings. It uses this air when diving for prey.

### Front legs

The spiny front legs are used for grabbing insect prey. Pond skaters have piercing, beaklike mouthparts that contain poisonous spit, which leaves prey unable to move.

### Middle legs

The pond skater's middle legs are used like oars. They push the insect across the pond's surface.



## Quick quiz

1. Why do flies, unlike pond skaters, drown in water?
2. Why are all water-walking animals small?
3. Can other animals walk on water?

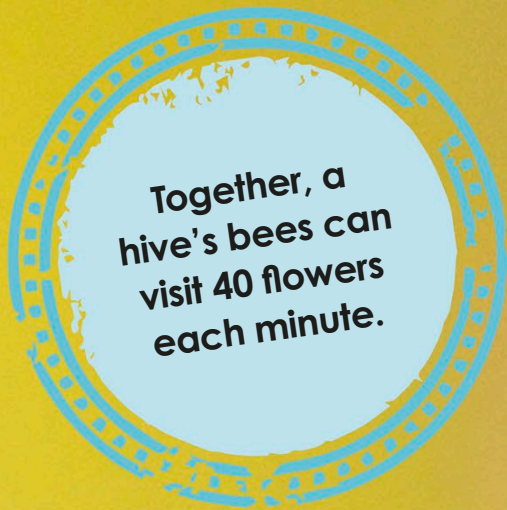
See pages 134–135 for the answers

# Why do honeybees dance?

It takes a lot of nectar to feed an entire honeybee hive, so when a bee finds some nectar-rich flowers, she shares her knowledge. Back at the hive, she performs a "waggle dance," which tells the other bees the location of the flowers.

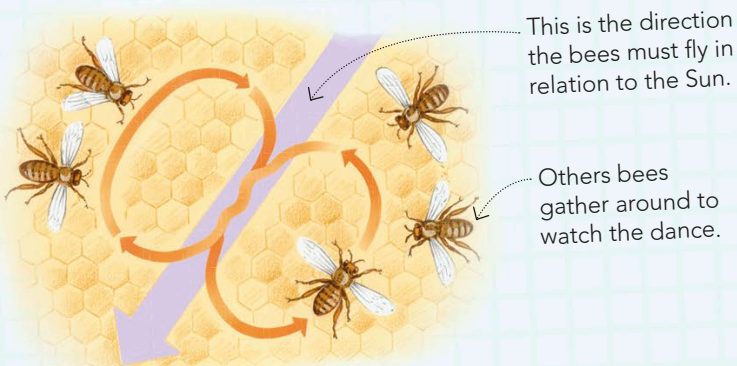
## Wings

The buzzing sound of a bee is made by the flapping of its wings.



## The waggle dance

The returning bee performs a figure-eight dance move, which tells other bees the direction in which they must fly to find the nectar. The faster the dance, the closer the nectar.



## ? True or false?

1. All bees are female.
2. Honeybees hibernate in the winter.
3. Honeybees need both nectar and pollen for food.

See pages 134–135 for the answers



## Drinking nectar

The bee drinks nectar from a flower's nectar-producing parts by using a special hairy tongue.



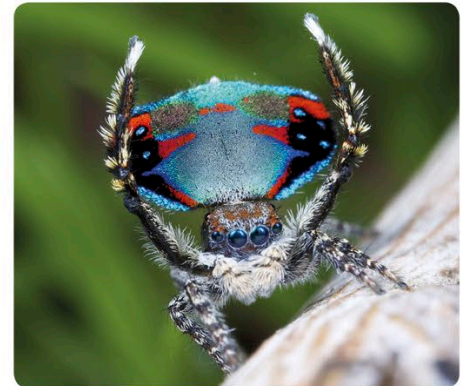
### ...Pollen sac

Flowers produce tiny grains of pollen to make seeds. Bees like to eat pollen. They collect it in a sac and fix it to a groove on their back legs to take home.

### Sting

Bees use their jagged, venomous sting to defend the hive.

## Which other animals dance?



### Peacock spider

The male peacock spider from Australia waves his body and legs in a very colorful dance to impress a female.



### Bird of paradise

Many birds of paradise have amazingly colorful feathers. Males, like this Western parotia, perform dances to attract females.

# Why do dung beetles collect poop?

There's got to be a good reason to roll a dung ball that's 10 times heavier than your body. For a dung beetle dad, however, it's all in a day's work. He collects other animal's poop to eat and to feed his young. Sometimes the mom even rides on top of the dung ball while he pushes it along.

## Which other animals clean up?



### Gravedigger

Sexton beetles bury dead animals, such as mice, and lay their eggs on the dead bodies so food is available when the eggs hatch.



### Leftovers

Scavenging vultures pick over the skin and bones left over from the kills of lions and other predators.

## Wings

The dung beetle's front wings are hard and shell-like. They cover up a second pair that are used for flying around to find dung. . . . .



## Look out behind

Beetles roll the dung with their middle and back legs, while the first pair grips the ground.



## Dung dinner

Dung beetle parents work together to bury the ball of dung. The mom then lays an egg inside it. The baby that hatches feasts on the dung so it can grow into an adult beetle.



## Precious poop

The beetle dad fights off other dung beetles that try to steal his ball.



## Quick quiz

1. What would happen if there were no dung beetles?
2. How do dung beetles make dung into a ball?
3. Do dung beetle parents look after their children?

See pages 134–135 for the answers

# Why are ants so busy?

No one can rest in an ant colony. Thousands of workers come and go to look after their nest. They must collect food, look after the young, and defend the colony. Deep inside their home the queen is busy, too, laying eggs that will become new workers.

A leaf-cutter ant can carry 50 times its body weight.

## Piece of leaf

After neatly cutting out a piece of leaf with its jaws, a strong leaf-cutter worker takes it back to the nest.

## Worker ants

Workers carry the fragments of leaves above their bodies. Spines on their backs help support the load.

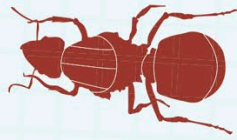


## In the colony

Ant queens are much larger than workers. They lay all the colonies' eggs, but the workers look after the eggs.

Soldiers are workers that have big heads with strong jaws. Their job is to defend the colony.

All workers are female. Workers collect leaves for the nest and the tiniest ones grow fungus on the leaves to feed the colony.



Queen



Soldier



Worker

## ? Quick quiz

1. Do worker ants lay eggs?
2. When do ants fly?
3. Do all ants collect leaves?

See pages 134–135 for the answers

## Cleaning up

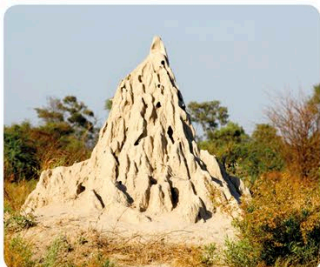
Some workers ride along and make sure the leaf is clean and pest-free.

## Fungus food

Workers bring leaf fragments back to the nest's "pantry." Smaller workers grow fungi on the leaves as food.

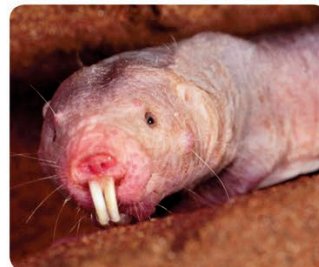


## What other animals are ruled by a queen?



### Termites

These white-bodied, antlike insects build huge towers out of clay to house their colony. A termite queen can grow up to 6 in (15 cm) long.



### Naked mole rats

These African mammals live underground in societies ruled by a queen. She mates with one or two males and, just like ants, her non-breeding daughter "workers" look after the burrow.

# Why do lice live in our hair?

Your head makes a comfortable home for certain insects, and can even provide them with food. A head louse grips your hair with its legs and uses its sharp mouthparts to puncture the skin when it's hungry, to drink your blood. Lice cannot fly, so stay on your body, gluing their egg cases to your hair.

## Magnified

Head lice are about 0.08–0.1 in (2–3 mm) long. This image has been magnified about 100 times. . . . .



A head louse bites 4 or 5 times per day.

## Which other animals can feed on our bodies?



### Tapeworm

A tapeworm can live inside your intestine (gut), where it absorbs some of your digested food. It gets there if you eat meat that is infected with tapeworm egg capsules. Some tapeworms can be as long as 33 ft (10 m).



### Leech

Leeches are worms that feed by biting skin and drinking blood. Once full, the leech drops off until hunger drives it to find a new victim. Leeches live in water and on land.

## Mouthparts

The louse sticks out needles from its head, which it uses to puncture the skin to suck up blood.

## Claws

Clawed legs help keep a tight grip on a hair. The louse moves slowly and has no wings, so cannot fly.

## Body

When the louse feeds, its abdomen (body) swells up as the stomach inside becomes filled with blood.

## ? True or false?

1. Nits are louse eggs.
2. Lice prefer dirty hair to clean hair.
3. Lice can move between human heads.

See pages 134–135 for the answers

# How does a spider make a web?

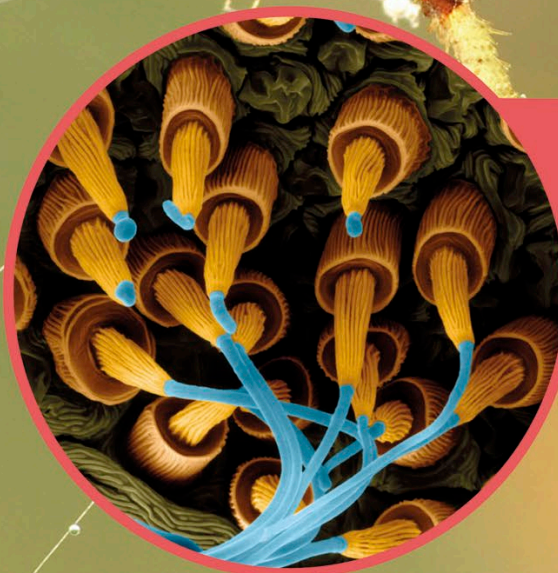
Spiders spin their webs using a special thread called silk. It is finer than human hair but stronger than steel and is perfect for trapping unsuspecting insects. Spiders create almost-invisible nets between leaves, then scatter them with sticky blobs so that anything that flies into the web can't escape.

## Orb-weaver

The European garden spider is an orb-weaving spider, which means it builds circular webs. It makes a new one each day. ....

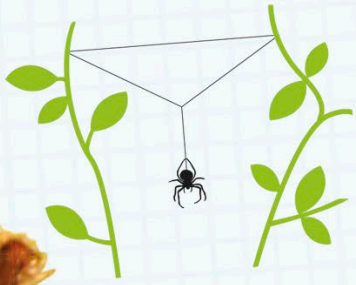
## Spinnerets

Silk starts off as a runny goo in a spider's rear end. It squirts out through special nozzles called spinnerets—a process a little like squeezing glue out of a tube. Then it hardens into silk threads.

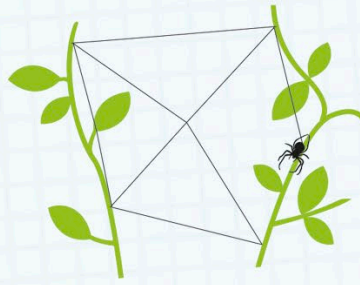




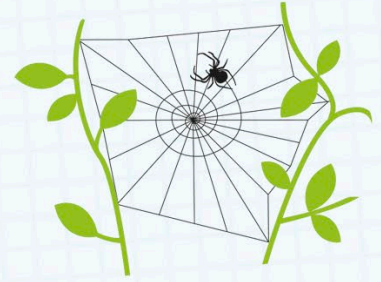
## How to build a web



1. The spider releases a thread of silk that is carried on a breeze until it fastens onto an object. The spider then releases a second thread to create a Y-shape.



2. The spider adds more silk threads running from the center outward. These are like the spokes of a wheel. They ensure that the web has a strong frame.



3. The spider spins a spiral of threads from the middle outward to strengthen the web. Then it works back toward the center adding a sticky spiral for trapping prey.

### Web

Orb webs are complicated nets spun in places where the spider knows insects will be flying.



### Quick quiz

1. Do spiders use silk for anything else?
2. What is the biggest web in the world?
3. What are "cobwebs"?

See pages 134–135 for the answers

## Which other animals use traps?



### Antlion

An antlion larva (juvenile) catches its prey by digging a sandpit. It waits buried at the bottom and uses its big jaws to grab ants that fall in.



### Black heron

Black herons create shadows by making "umbrellas" with their wings. This lures in nervous fish that think they are safe by hiding in the shade.

# What's inside a snail's shell?

A snail carries its home on its back. The shell protects its soft body and vital organs, such as the heart. Deep within the shell, the snail's body is attached to a spiral chamber by a muscle. This pulls the snail inside at the first sign of danger.

## ? True or false?

1. A slug is simply a snail without a shell.
2. Garden snails are vegetarian.
3. Some snails breathe using gills.

See pages 134–135 for the answers

Garden snails are neither male nor female—they have both kinds of sex organs.

## Shell

The shell is made from hard chalky and hornlike substances.



## Eyes

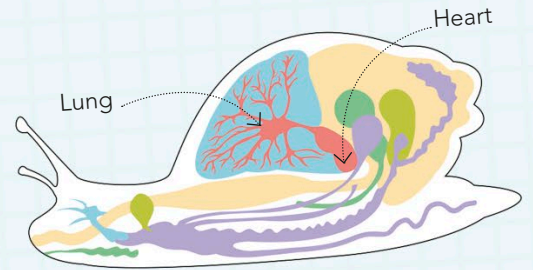
A typical garden snail has eyes on the ends of tentacles to see what's happening outside the shell.

## Muscular foot

The snail has a single foot for creeping forward. It is packed with rippling muscles to pull the snail and its shell along.

## Inside the shell

A snail's vital organs, such as its lung and heart, stay hidden inside the shell. Only its head and muscular foot come out, so it can get around and sense the surroundings.



## Do other animals carry their homes?



### Turtles

A shell is like a suit of armor for turtles and tortoises. Some can even pull their head and feet inside.



### Hermit crabs

Most crabs grow a hard shell, but not hermit crabs. Instead, they use empty snail shells to protect their soft bodies.

# How do mosquitoes find their prey?

It's no wonder we struggle to keep mosquitoes away. They find us by smelling the carbon dioxide in the air we breathe out. When they get closer, they home in on our warm, sweaty skin. You only need to watch out for females, though, because the males don't drink blood.

A mosquito can spend 2 to 3 minutes feeding on blood.



## Antennae

The female mosquito's antennae (feelers) detect the smell of a victim. Males have bushier antennae for finding females. They feed on nectar, not blood.

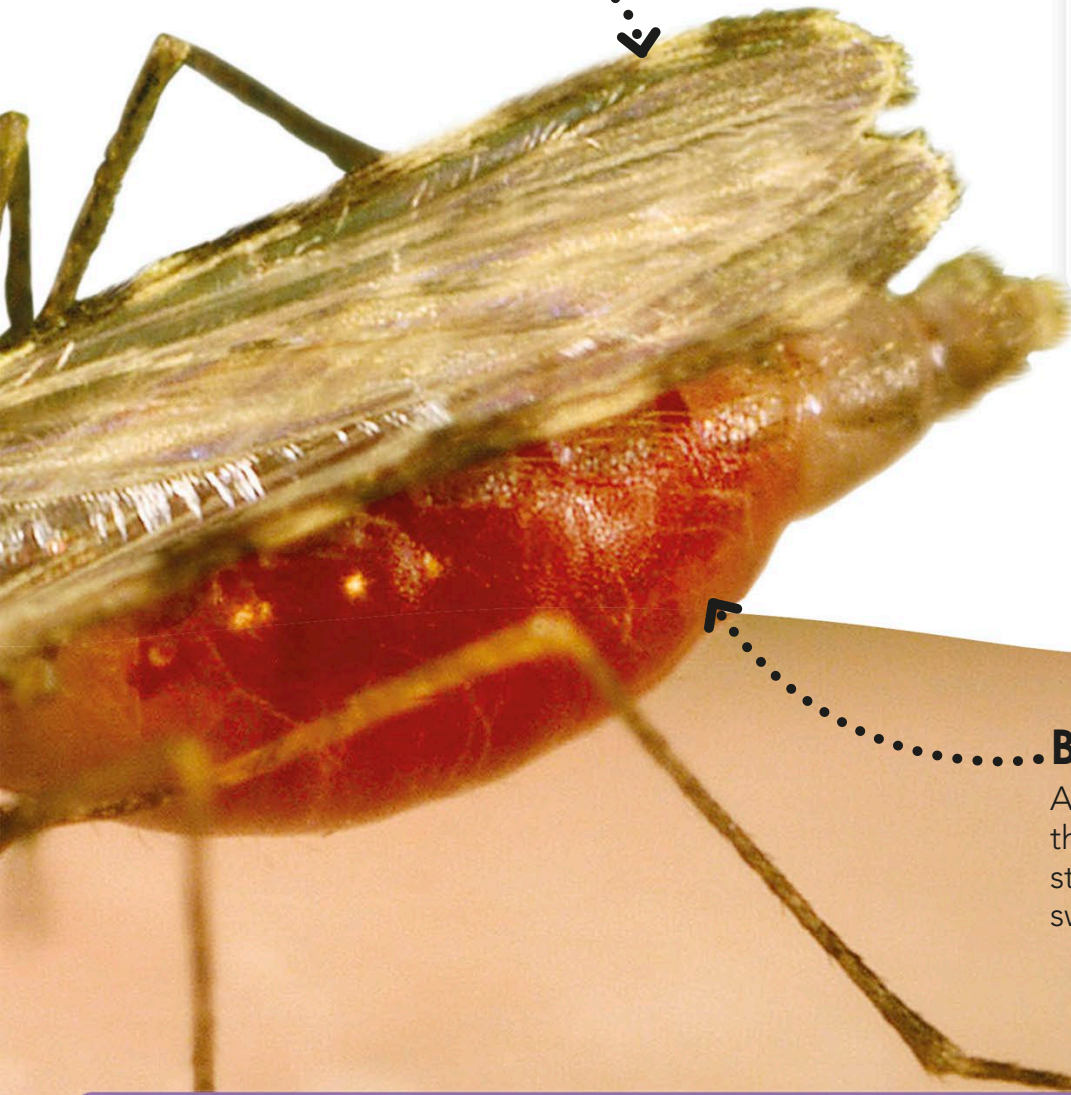
## Stabbing mouthparts

The female's mouthparts are long and sharp for piercing the skin's surface.



## Wings

The mosquito uses a single pair of wings to fly around and find her victim. The wings lie flat along the body when not in use. . . .



## ? Quick quiz

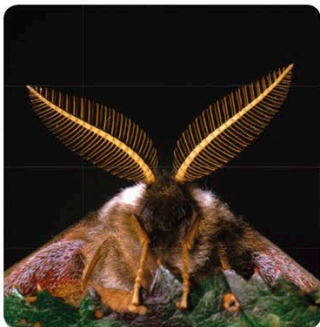
1. Do all mosquitoes feed on blood?
2. Can bloodsucking mosquitoes be dangerous?
3. Why do mosquito bites itch?

See pages 134–135 for the answers

## .....Blood

As the mosquito feeds, the blood passes into its stomach, making its body swell up and turn red.

## What other insects have super senses?



### Emperor moths

Male emperor moths are champions at smelling. Males can even find a female when she is 6 miles (10 km) away. It's just as well—the moths don't live long and have just one month to find a mate.

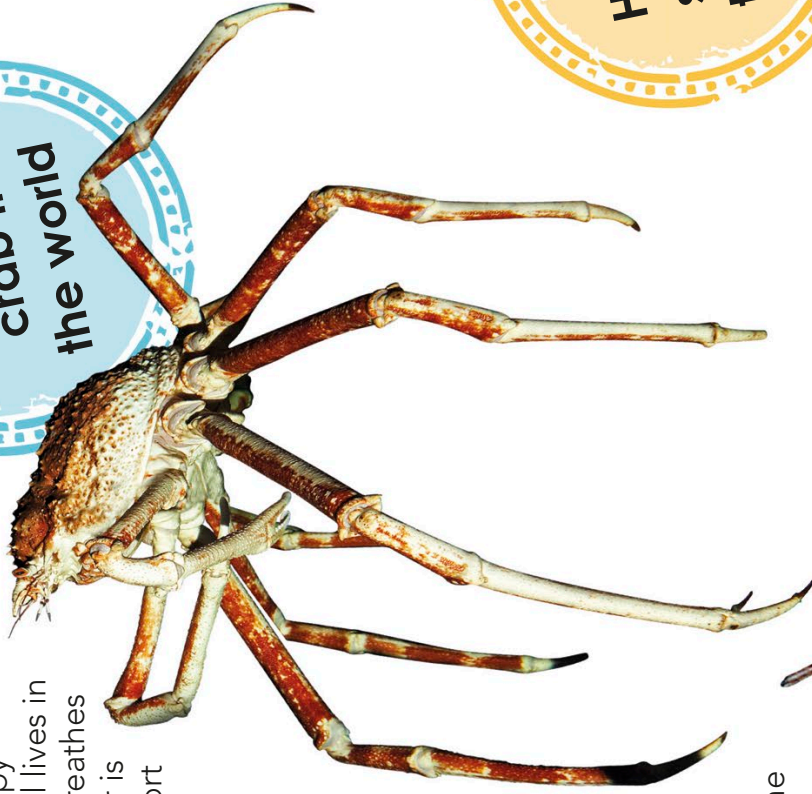


### Black fire beetles

Most animals run from forest fires, but not the black fire beetle. It has sensors that attract it to heat and flames. The beetle then lays its eggs in the dead charred wood.

### Japanese spider crab

The biggest creepy-crawly of them all lives in the ocean and breathes using gills. Water is needed to support its massive 12 ft (3.8 m) legspan.



Longest crab in the world

### ? Picture quiz



What type of insect has the biggest wings?

See pages 134–135 for the answer

### Chan's megastick

It is easy to miss the world's longest insect. The body of this stick insect is 14 in (36 cm) long, but it looks like a twig—until it moves.



Longest insect in the world

Heaviest spider in the world



### Goliath spider

The heaviest spider can weigh up to 6 oz (175 g), but its bite is no worse than a wasp sting.





**Giant weta**

The world's heaviest insect is a type of cricket that lives in New Zealand. A female weta packed with eggs can be three times heavier than a mouse.

Heaviest insect in the world

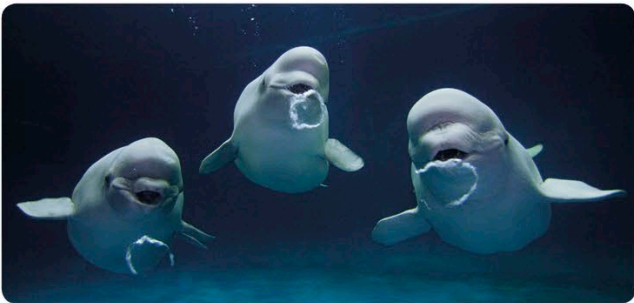
# What is the world's biggest creepy-crawly?

The world is filled with tiny creepy-crawlies, but some can grow to huge sizes. The word "biggest" can refer to different things. We can use it to mean an animal's length, width, or weight. The giants on this page are about as big as creepy-crawlies can get.

# How do grasshoppers sing?

The loud chirps of grasshoppers can fill the air on a summer's day. The males of this insect sing to attract females, but they don't use their mouths. Most have little combs on their legs and chirp by rubbing them against their wings. Crickets sing in a similar way, but rub their wings together.

## Which other animals sing?



### Whistling whales

Beluga whales sing so sweetly that they have been called the "canaries of the sea." They whistle by moving air under their blowholes. They do this to communicate with one another.



### Mouse maestro

Like grasshoppers, male mice sing songs to attract females. If a male mouse thinks that a female is nearby, he will sing louder. But you are unlikely to hear him. His song is too high-pitched for human ears to hear.

## Feelers

Antennae (feelers) detect scents and may even help males know if a female is nearby. . . .

The way a grasshopper makes a song is called stridulation.



## ? Quick quiz

1. Do any other animals make sounds in the same way as a grasshopper?
2. Do grasshoppers all sound the same?
3. What are the noisiest insects?

See pages 134–135 for the answers

### File

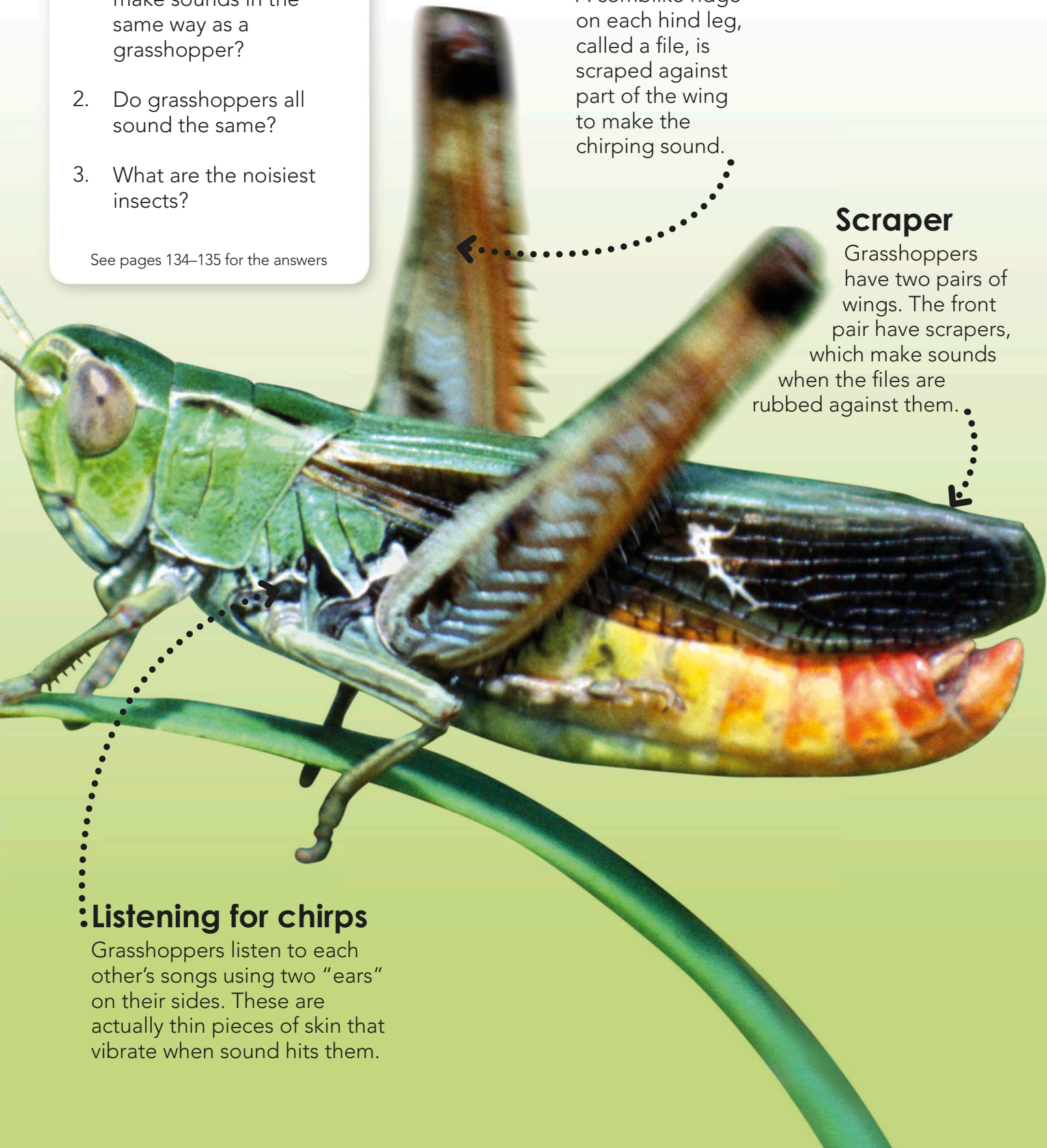
A comblike ridge on each hind leg, called a file, is scraped against part of the wing to make the chirping sound.

### Scraper

Grasshoppers have two pairs of wings. The front pair have scrapers, which make sounds when the files are rubbed against them.

### Listening for chirps

Grasshoppers listen to each other's songs using two "ears" on their sides. These are actually thin pieces of skin that vibrate when sound hits them.





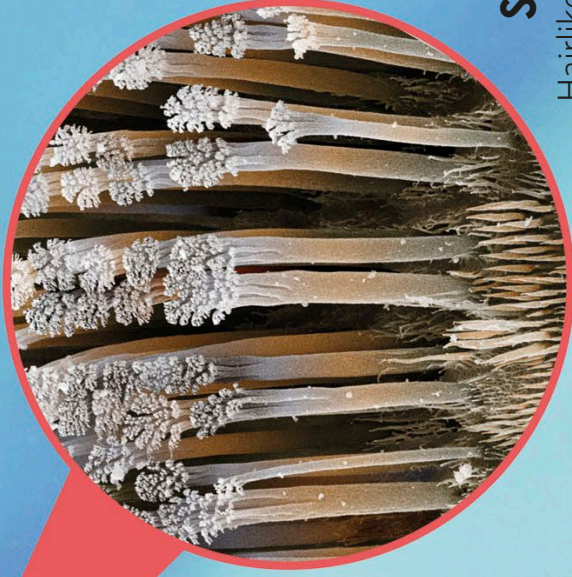


# Reptiles and amphibians

Reptiles and amphibians are cold-blooded.  
Reptiles have dry and scaly skin, while  
amphibians are moist and slimy.

# How do geckos walk upside down?

Geckos are small lizards that have an amazing ability: they can walk up walls and upside down along ceilings. Special pads on their feet help them cling to smooth surfaces, such as leaves or glass.



## Sticky toes

Hairlike bristles on the underside of a gecko's toes are so tiny that you would need a microscope to see them.



## Lightweight body

Most geckos are no bigger than a mouse. Millions of sticky bristles on their toes provide enough grip to hold their weight without falling.

## Tiny claws

A wall-climbing gecko only has tiny claws because these are not needed to grip smooth, flat surfaces.



## Specialized feet

The toes of a gecko's feet end in wide pads for clinging onto surfaces.

## Which other animals are good climbers?



### Alpine ibex

This goat lives on the Alps mountains in Europe. Its hooves can spread outward, giving it a good grip on near-vertical rock surfaces.



### Housefly

Houseflies and other insects have bristly pads on their feet to help them stick to walls, just like geckos do.



## Quick quiz

1. Why do geckos need to climb?
2. Can all geckos climb walls and ceilings?
3. How did geckos get their name?

See pages 134–135 for the answers

# How do chameleons change color?

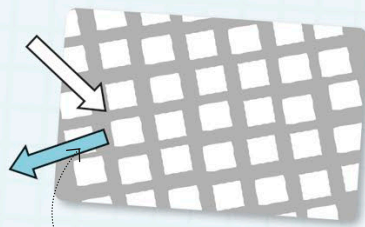
Chameleons can change their color as easily as you can nod your head. They do it by moving around tiny crystals that lie under their skin. Different colors indicate what mood they are in.

## Red for display

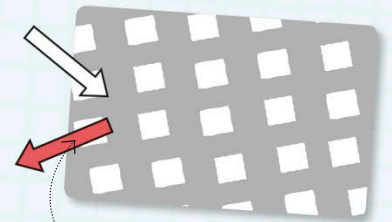
The male chameleon can flash red to show that he is in an excited mood. This either warns off other males or can attract females.

## It's done with mirrors

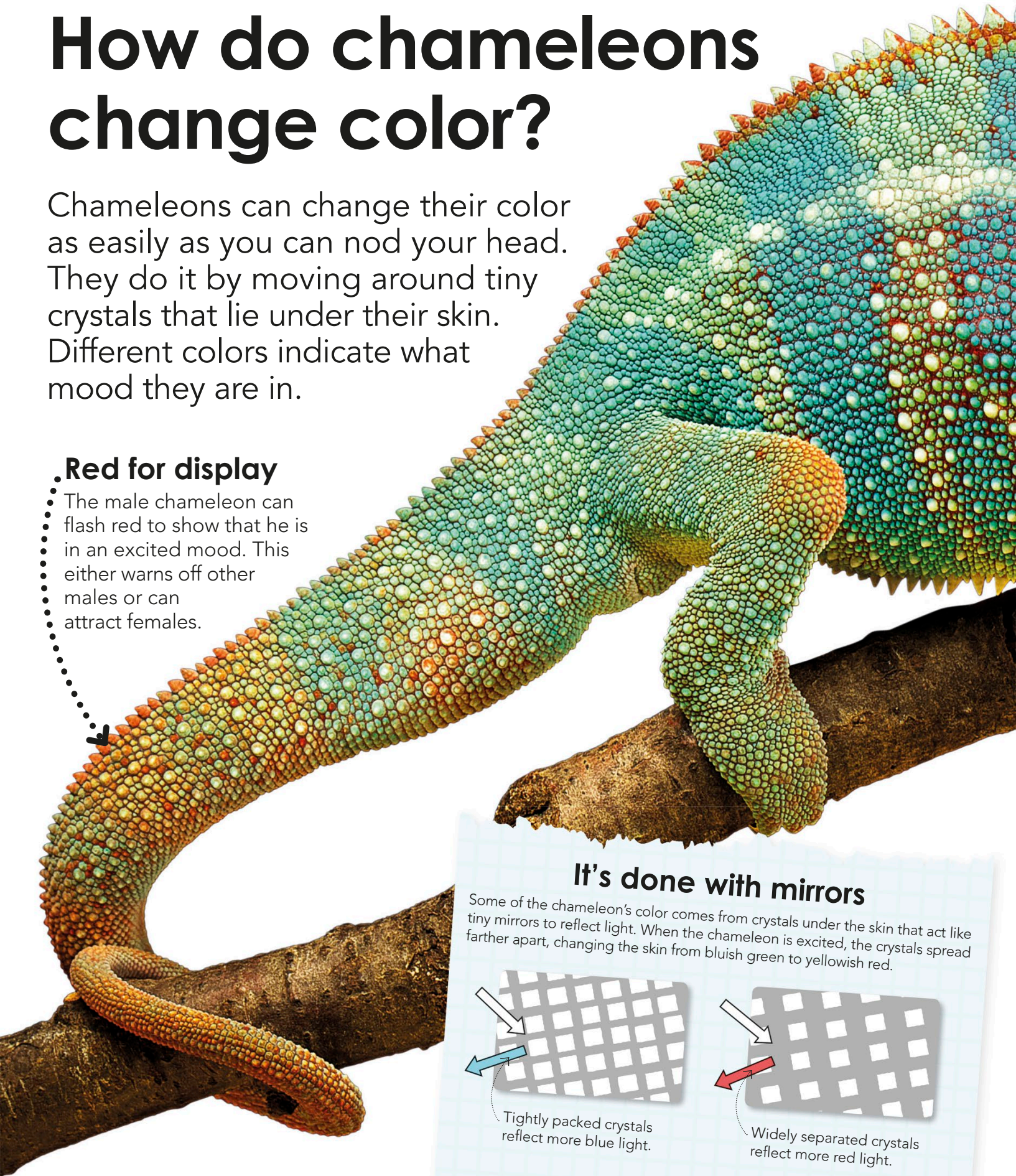
Some of the chameleon's color comes from crystals under the skin that act like tiny mirrors to reflect light. When the chameleon is excited, the crystals spread farther apart, changing the skin from bluish green to yellowish red.



Tightly packed crystals reflect more blue light.



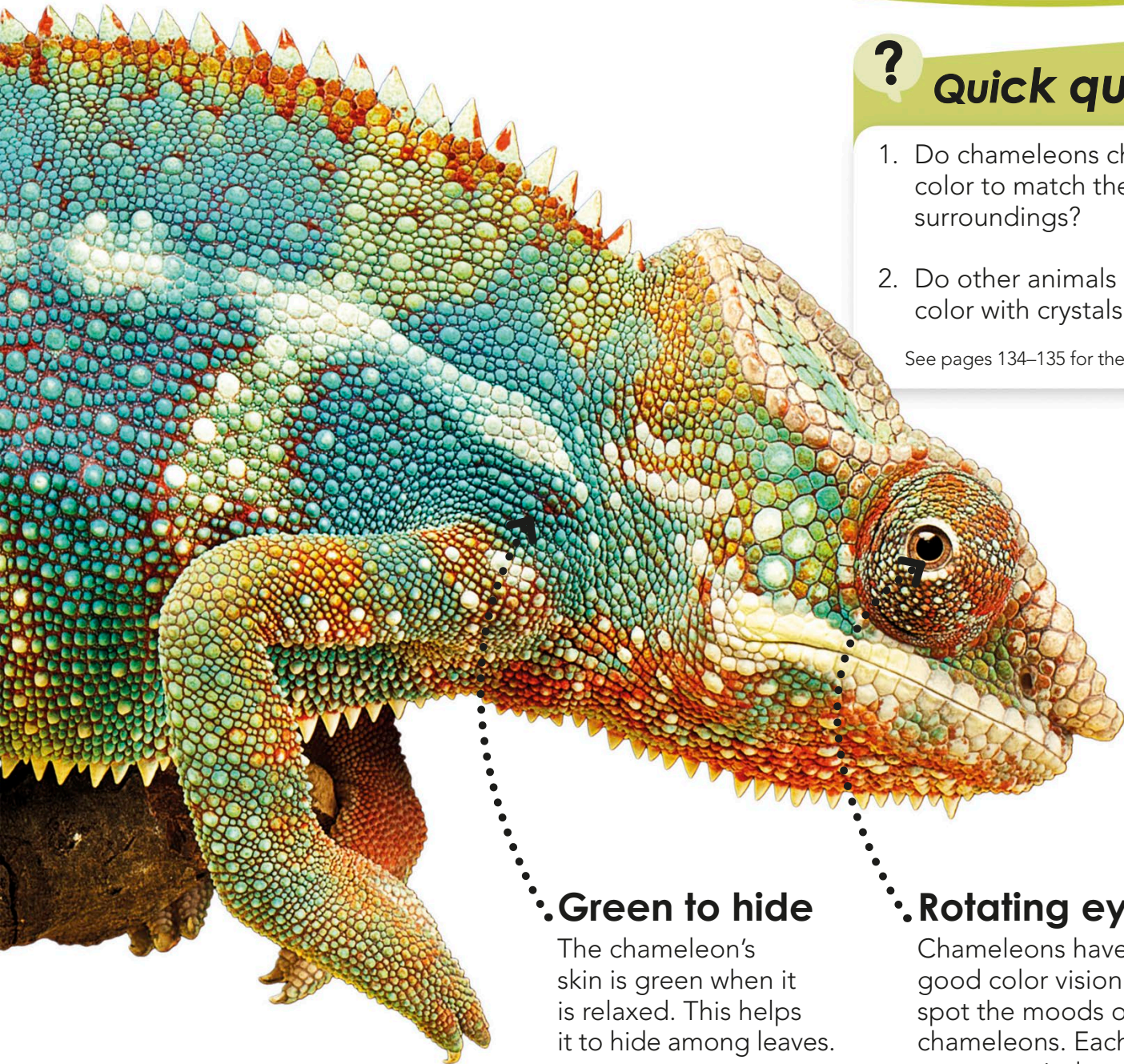
Widely separated crystals reflect more red light.



## ? Quick quiz

1. Do chameleons change color to match their surroundings?
2. Do other animals change color with crystals?

See pages 134–135 for the answers



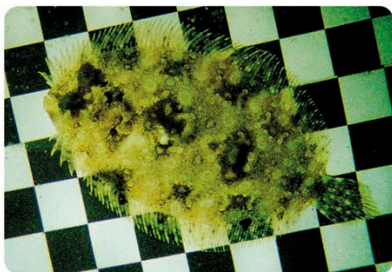
### • Green to hide

The chameleon's skin is green when it is relaxed. This helps it to hide among leaves.

### • Rotating eyes

Chameleons have good color vision to spot the moods of other chameleons. Each eye can rotate independently of the other.

## Which other animals can change color?



### Flatfish

Some flatfish, such as this flounder, are so good at changing color that they can match the pattern of the background they have settled on.



### Golden tortoise beetle

This beetle can change color from golden to red with spots to scare off birds and other predators who think it could make a tasty snack.

# Why do snakes stick out their tongues?

They might look rude, but snakes have a good reason to flick their tongues out. In addition to tasting things, a snake's tongue is used to pick up smells in the air—such as the scent of fresh prey.



## Quick quiz

1. Are all snakes hunters?
2. Do snakes use other methods to find prey?

See pages 134–135 for the answers

## Looking around

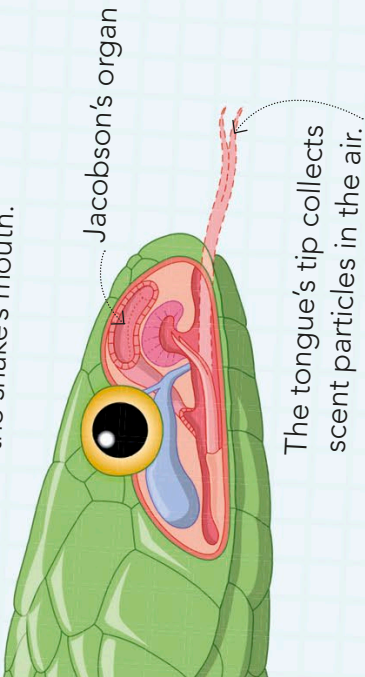
Snakes have fairly good vision, but it is usually not good enough to track prey.





## Jacobson's organ

The tongue transfers scent to a tasting pad, called the Jacobson's organ, in the roof of the snake's mouth.

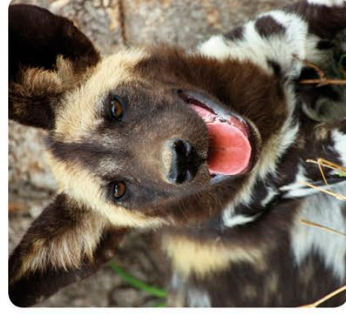


## Forked tongue

The forked tip picks up scents coming from both sides, so the snake can tell which direction the scent is coming from.....



## What else do animals use their tongue for?



### Cooling

When a dog pants and sticks out its tongue, the moisture on the surface of the tongue evaporates. This helps to cool the body down.



### Grooming

A wet tongue is as good as a wash cloth for cleaning. A tiger's tongue even has bristles, so the tiger can give itself a good scrub, too.



### Hunting

A chameleon's tongue can flick out so far and so fast that it's perfect for grabbing insects. The tip of the tongue has a sucker, so the chameleon's dinner can't wriggle free.

# What is an axolotl?

An axolotl, a kind of salamander, is a lizardlike amphibian that never grows up. Other salamanders start as tadpoles with gills, before developing lungs so that they can breathe on land. The axolotl, however, keeps its gills and spends its entire life in water.

## Thin-skinned

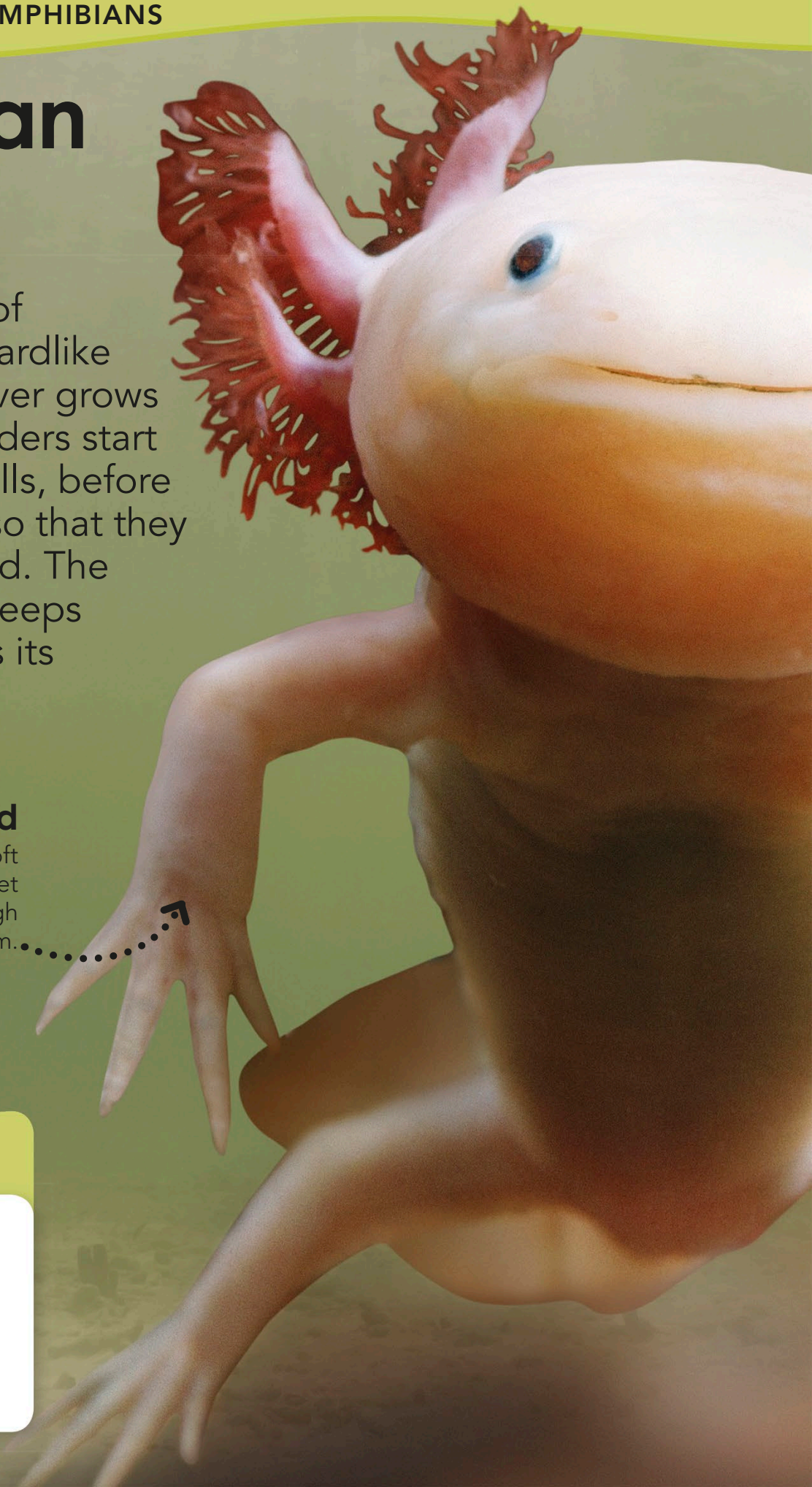
An axolotl's skin is so soft and thin that it can let oxygen straight through into the bloodstream.



## Quick quiz

1. Do axolotls have skeletons?
2. Are axolotls endangered?

See pages 134–135 for the answers



## Feathery gills

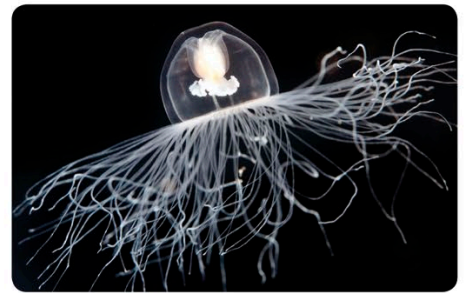
An axolotl mainly uses its feathery gills to breathe in water. It also gets rid of some of its body waste through its gills.

## Regrowth

Animals can usually repair wounds after injury, but axolotls can regrow entire lost limbs.

In the wild, axolotls are found only in two lakes on the outskirts of Mexico City, Mexico.

## Which other animals never grow up?



### Immortal jellyfish

This tiny jellyfish can settle on the seabed and turn back into its anemone-like baby form to start its development all over again. So perhaps it can live forever!



### Wingless aphids

Aphids are insects that suck sap. When lots of food is available, they produce babies that never grow wings—because they don't need to fly away to find food.

# Are dragons real?

The fire-breathing dragons that you find in storybooks don't exist in the real world, but a different kind of dragon does. Named after the island in Indonesia where it lives, the Komodo dragon is the world's biggest lizard.

## ? Picture quiz



Which tiny beetle sprays hot, fiery liquid from its bottom to warn off attackers?

See pages 134–135 for the answer

A Komodo dragon  
can grow to the size  
of a crocodile.

## Forked tongue

The Komodo dragon is the largest predator on its island. It flicks its forked tongue to pick up the scent of prey several miles away.



## Heavyweight

The biggest Komodo dragons are heavier than a grown man, and powerful enough to bring down animals the size of a deer.

## Which other animals look like dragons?



### Frilled lizard

When this Australian lizard senses danger, it raises a big neck frill, which encircles its head to make it look bigger.



### Flying dragon

By stretching its expandable ribs, this lizard can open up flaps along its body. It uses them to glide between trees.

## Tough skin

Like all reptiles, and the dragons in stories, a Komodo dragon's skin is covered in hard scales. These act like armor in battles with other animals over food.

## Deadly claws

Like a storybook dragon, a Komodo dragon has long, sharp claws for ripping open the hides of big prey.

# Why are poison dart frogs so colorful?

Poison dart frogs are so brightly colored that they look like jewels on the floor of their rain forest habitat. But their colors do more than make them look beautiful—they warn hungry predators to stay away. These frogs can be deadly poisonous.

## ? True or false?

1. All poison dart frogs are deadly.
2. Captive poison dart frogs can lose their poisons over time.

See pages 134–135 for the answers

## Different colors

This strawberry poison dart frog gets its name from its red skin, but some individuals are yellow or blue. . . .





### Deadly slime

The poison dart frog's poisons are in the slime that covers the surface of its body.

### Crawling diet

Poison dart frogs get their poisons by eating certain kinds of tiny creepy-crawlies, such as mites (like the one shown here) or ants.



### Why else do animals use color?



#### Warning

A morpho butterfly's wings are brilliant blue on the upper surface. A quick flash of color when it opens its wings can startle and scare off insect-eating birds.



#### Hunting

The color of an orchid mantis matches the flower it sits on. This helps it hide so it can grab unsuspecting insects coming for nectar.

# How long does a tortoise live?

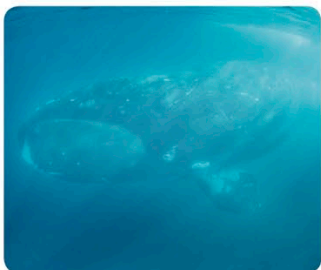
Tortoises really do live life in the slow lane. Their large shells makes them move slowly and their cold-blooded bodies work at a gentler pace than ours—so they take longer to wear out. Giant tortoises may live for more than a century.

## Old legs

Very old tortoises can get arthritis (painful joints). This can slow down their walking. . . . .



## Which other animals live a long time?



### Long-lived giant

All whales live for a long time, but the bowhead whale lives the longest—and far longer than any other kind of mammal. Some individuals could still be breeding after a century and may live for 200 years.



### A long reign

Insects don't usually live very long, but a termite queen may live up to 50 years. She spends her life deep inside a termite mound, producing eggs that develop into the workers of the termite's colony.



## .....Growth rings

The plates of a tortoise shell get wider as the animal grows, sometimes making a ring every year—a bit like a tree trunk.



## Picture quiz



Which birds can spend a 40-year lifetime together?

See pages 134–135 for the answer

## .....Tough scales

Like other reptiles, tortoises have scaly skin. The scales have a tough, horny coating, which flakes off as it is replaced from below.

A giant tortoise that died in a zoo in 2006 may have hatched from its egg in 1750.

# Do reptiles have cold blood?

Reptiles are often described as “cold-blooded,” but their body temperature changes with their surroundings. On a cool day, a reptile has cold blood, but it warms up in the sun. If lizards are too cold, their muscles are slow and they cannot run around.

There are over 10,000 species of reptile, and most of these are found in the hot tropics.

## Heating up and cooling down



### Heating up

Reptiles, such as this turtle, love to bask in the sun. They use the sun's heat to warm up, helping to make them more active.



### Cooling down

Some reptiles can overheat if they stay in the sun too long. Crocodiles open their mouths to cool down. They lose heat from the inside of their mouths, like a panting dog.

## ? True or false?

1. Are there any reptiles found in cold parts of the world?
2. How do ocean reptiles stay warm?
3. Which other animals are “cold-blooded”?

See pages 134–135 for the answers

## Eyes for daylight

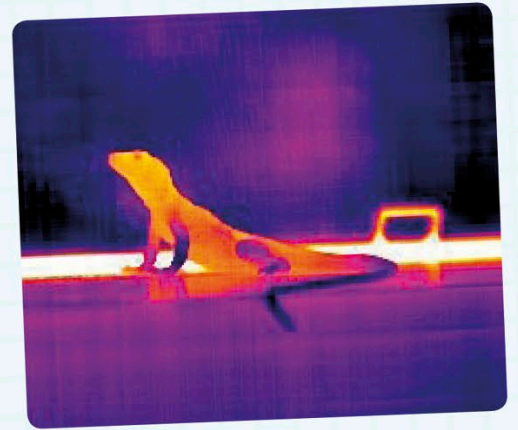
Being active in the heat of the day means lizards can see to find food and mates. Some have better vision than most mammals.

## Scaly skin

Lizards and other reptiles are covered in hard scales that stop their skin from drying out under the hot sun.

## Thermal imaging

This picture of a lizard is called a thermal image. The special camera shows the different temperatures in different colors. The sun has warmed some parts of the lizard's body (which look orange), but other parts are still cool (purple).



## Sun bed

On cold mornings, reptiles often find a sunny spot, such as on top of a boulder, to warm up quickly. This is called basking.



# Why are frogs slimy?

If you've ever tried to grab a frog, you'll know how slippery it can be. A frog's skin oozes with slime. It stops the skin from drying out, but also helps to protect it from infection. Some frogs have bitter poisons in their slime to scare away predators, while others use their slime to make nests for their eggs.

Some poisonous frogs produce slime that is deadly to humans.

## Gripping feet

The slime on the frog's toes helps it to stick to leaves and branches. The frog lays its eggs on high branches to protect them from any egg-eating animals below.

## ? Quick quiz

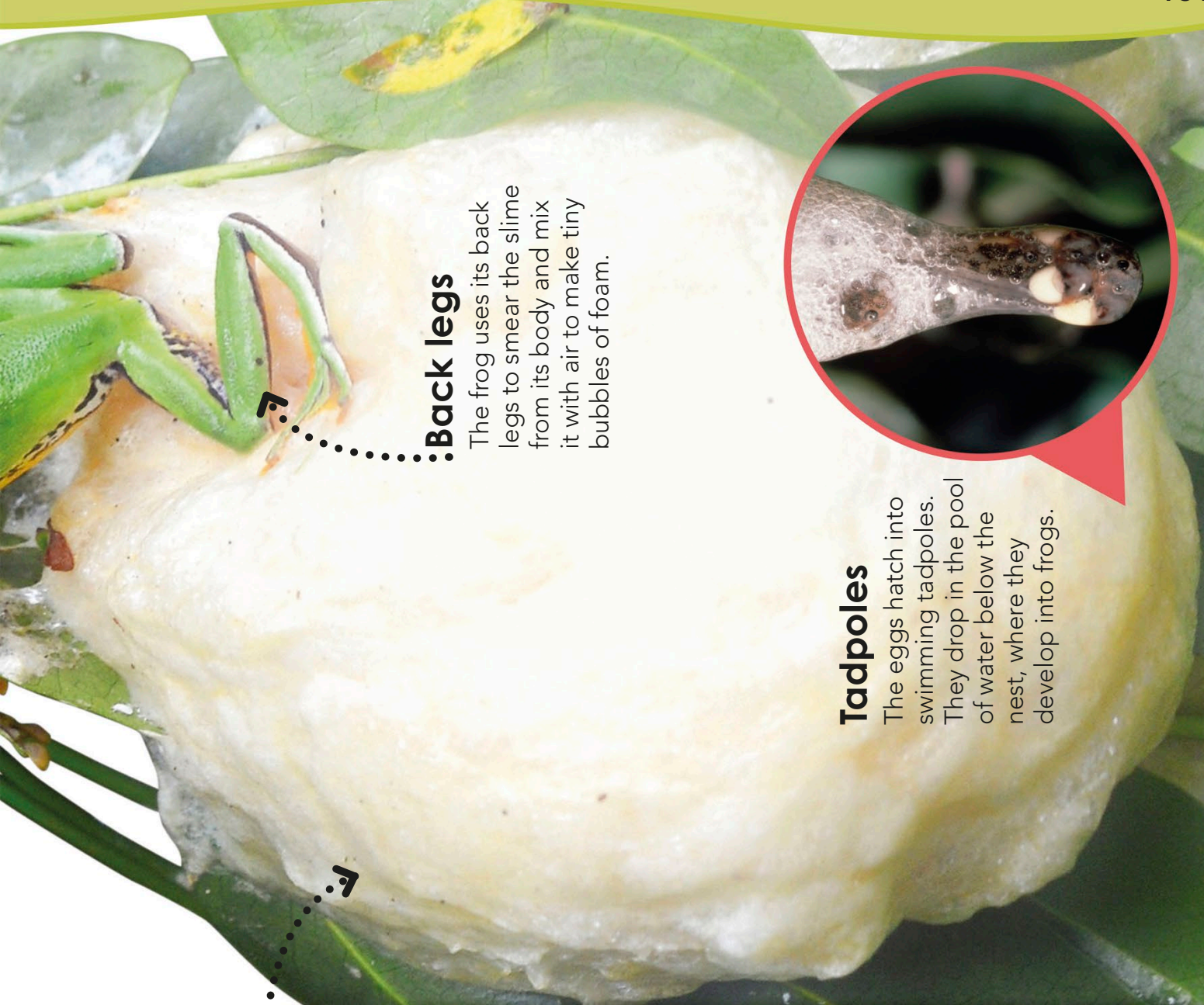
1. Why aren't snakes and lizards slimy?
2. Do humans produce slime?
3. Does a frog's slime wash off when it rains?

See pages 134–135 for the answers

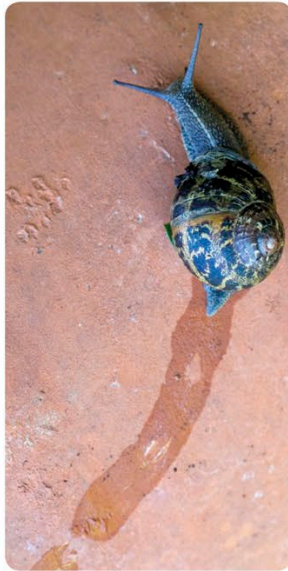


## Slimy foam

Forest green tree frogs whip slime into a froth for their eggs. The outer surface hardens to protect the moist eggs inside.



## Other slimy creatures



### Snail

The slime produced by a snail makes a slippery carpet to help keep its muscular foot sliding forward. It leaves a telltale trail behind it.



### Hagfish

The world's slimiest animal uses slime to clog the gills of fish that want to eat it. A single hagfish can produce a bucketful of slime in just minutes.

### Back legs

The frog uses its back legs to smear the slime from its body and mix it with air to make tiny bubbles of foam.

### Tadpoles

The eggs hatch into swimming tadpoles. They drop in the pool of water below the nest, where they develop into frogs.



# Do crocodiles really cry?

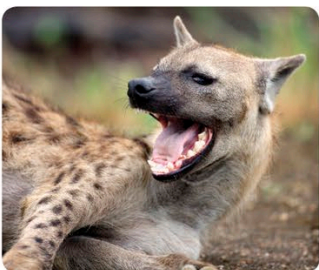
Tearful eyes don't always mean that an animal is feeling sad. Crocodiles don't cry when they're upset, but, like humans, they shed tears to stop their eyes from drying out. These tears help to keep their eyes clean, too.

## Scaly skin

Crocodiles are covered in tough, waterproof scales.

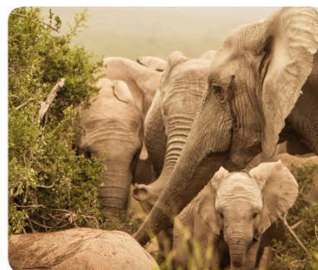


## Do any animals feel human emotions?



### Laughing hyenas

Hyenas make giggling sounds when they are scared or excited, not because they are happy. They even giggle when they are being bullied by other members of their group.



### Mourning elephants

Some scientists think that elephants feel sadness like humans do. When a member of the herd dies, elephants may stay with their dead companion for a short time, and even cry "real" tears.

## Look out

A crocodile's eyes are high on its head so it can still see when the rest of its body is in the water.



## Making tears

Crocodile tears are made in little sacs, and run onto the surface of the eye through tiny tubes. A special third eyelid smears the tears over the surface.



## Grab a bite

When a crocodile snaps its jaws shut, the force of the bite may cause tears to squeeze out.



## True or false?

1. Crocodiles cry when they are sad.
2. Saltwater crocodiles are the biggest and weepiest crocodiles.
3. Many animals have three eyelids.

See pages 134–135 for the answers

# Answers

**Page 8** 1) Packs that hunt big elk can have 15–20 members. 2) Usually different packs stay away from each other. But if they meet up they may fight. 3) Wolves howl to bring members of the pack together and to scare off other packs.

**Page 11** 1) Having an appearance that helps an animal to blend into its surroundings. 2) Not many other cats have stripes. The European wild cat has striped markings, as do some pet cats. 3) Their stripes may dazzle and confuse predators, or help individuals recognize one another. **Page 12** 1) Yes, bats have good vision. However, like many mammals active at night, most cannot see color. 2) Most bats use their voice box, but a few can click with their tongues. Some bats have fleshy structures on their noses that work like megaphones. 3) No, some bats eat fruit, nectar, or pollen. Some big bats eat birds, lizards, frogs, or even fish. And vampire bats have a taste for blood.

**Page 15** 1) The Arctic. 2) They have a layer of fat, called blubber, which helps keep body warmth trapped inside. 3) Males sometimes use their tusks for fighting. **Page 17**

A swan. **Page 19** A placental. **Page 21** 1) Africa and tropical Asia. 2) Elephants can probably live up to about 70 years. 3) The oldest female—and leader—of an elephant herd.

**Page 23** 1) False. Some water is produced when a camel burns the fat in its hump, but it relies on drinking water. 2) True. Camels were introduced to Australia by humans. 3) True. The spit is also mixed with some spewed-up stomach contents for extra effect! **Page 24** A husky.

**Page 27** 1) No, only spider monkeys, woolly monkeys, and howler monkeys have prehensile tails. 2) Gibbons can reach top speeds of 35 mph (55 kph). They are actually

small apes, rather than monkeys. 3) Many monkeys have opposable thumbs and big toes, meaning that they can grasp around a branch with the opposite fingers and toes. **Page 29** A rat. Rat teeth grow continuously as they are worn down by chewing.

**Page 30** 1) A lone sentry calls out with a shrieking bark. Everyone in the group then runs for safety. 2) They escape down burrows, which is also where they raise their young and sleep at night. 3) No, a group usually has 10–15 individuals from two or three families. **Page 32** 1) Their soft fur is like velvet and can lie flat in every direction. This helps a mole to easily move forward and backward through its burrow. 2) These are mounds of earth that are formed on the surface when moles push soil out of a deep tunnel. 3) A mole can eat half its body weight in food each day—mainly earthworms and insects. Star-nosed moles eat shrimp and fish. **Page 34** 1) Animals that rely on vision in bright daylight often have good color vision. 2) Some people are born color-blind because their eyes don't have all the working color sensors for full color vision. **Page 36** 1) They eat a wide range of different foods, including animals and plants. 2) Polar bear. 3) Giant panda.

**Page 39** 1) The only land predators in Antarctica are seabirds. Penguin eggs and chicks could be eaten by seabirds, such as skuas and petrels. 2) Galápagos penguin. It is found only on the Galápagos Islands off the Pacific coast of South America, just south of the equator. 3) No. There are plenty of land predators in the Arctic, such as the polar bear and Arctic fox, so birds need to be able to fly to escape danger. **Page 42** Kingfisher. **Page 44** 1) In zoos they don't have access to brine shrimp or algae, so they are

fed a special diet that contains the substance that makes them pink. 2) A baby flamingo is born with a straight beak. It becomes curved as it grows older. 3) One. **Page 46** 1) b.

2) a. An owl's eyes are so big that its eyeballs cannot move around. An owl has to turn its whole head to look in different directions. **Page 48** 1) False. This myth may have started because ostriches sometimes try to avoid danger by sitting down with their heads and necks stretched out on the ground in front of them. 2) True. Ostriches can keep up a speed of 30 mph (50 kph) for half an hour—and can reach a top speed of 40 mph (70 kph).

**Page 50** 1) b. 2) a. **Page 53** 1) Many birds that don't migrate feed mainly on things such as berries, seeds, or worms that are available all year round. Or they live in the tropics where it is always warm. 2) No, migrations follow many different kinds of routes depending on the needs of the animals. 3) No, long-distance migration can even happen on a daily basis. In the ocean many animals swim from the depths upward to feed at the surface at night. **Page 54** Common swift. **Page 56**

1) Some hummingbirds build thimble-sized nests from cobwebs. Their eggs are no bigger than peas. 2) No, many seabirds lay their eggs on bare rocky ledges. The white tern lays its egg in a groove in a branch of a tree. 3) Many small mammals, stickleback fish, and crocodiles build nests for their young. Some insects, such as termites, build some of the biggest nests of any animal. **Page 58** 1) True. Adult emperor penguins can stand up to 50 in (130 cm) tall and are the fifth heaviest of all birds. 2) False. Other birds breed on the coastline, but no bird breeds as far south as the emperor penguin. **Page 61**

1) b. 2) c. A pair of eagles use

the same nest, built from sticks, each year, and keep adding to it so it gets bigger. **Page 63**

1) True. 2) True. For instance, they may do it to show off their territory. 3) True. **Page 66**

1) True. Many kinds of deep sea fish produce light—either for attracting mates, confusing predators, or luring in prey.

2) True. No rabbits can produce light naturally, but scientists have managed to make rabbits glow. **Page 69**

1) No, some kinds of parrotfish rely on finding a sheltered spot. 2) No, many fish are active at night and sleep during the day. **Page 70**

1) Yes, the biggest pufferfish use their teeth to open mussels, clams, and shellfish. 2) Tiny pufferfish can also puff up, but they usually rely on staying hidden among rocks to stay safe. 3) It slowly lets the seawater back out of its mouth.

**Page 72** The flying squid.

**Page 74** 1) False. Sharks that do bite humans generally do it by mistake. 2) True. They produce new teeth to replace the old ones that fall out.

**Page 76** 1) Each coral polyp has tiny stingers on its tentacles. 2) Coral grows best in warm sun-lit waters. As a coral colony grows it forms huge, rocky outgrowths and the whole structure is called a reef. **Page 78** 1) a. 2) b.

**Page 80** 1) The strange, tadpole-shaped snailfish could live the deepest. It lives at least 26,000 ft (8,000 m) below the surface. 2) Scientists can visit the deep sea in special submarine-like vehicles called submersibles. **Page 82**

1) Anemones eat tiny animals floating in the sea. Their stinging tentacles paralyze their prey. 2) Yes, all fish have a coating of slime. It helps protect them from parasites and injury. 3) Yes, anemones are animals that are related to jellyfish. **Page 85** The sidewinder, a type of rattlesnake. **Page 86** 1) True.



There are dozens of members of the piranha family and they all live in tropical South America. 2) False. Some piranhas eat seeds, nuts, or fruit. 3) False. They are most active during the day. **Page 89** 1) b. We only know about the spade-toothed whale because of a few individuals that have washed up on beaches. It has never been seen alive. 2) a. Whaling for profit was banned in 1986 to help whale populations recover. **Page 93** 1) A fly doesn't have the special waxy hairs that stop pond-skaters getting wet, so it gets trapped in the water. 2) An animal needs to be lightweight for the surface "skin" of water to support its body. 3) Yes. Some insects and spiders can. The tiny pygmy gecko, a type of lizard, has special water-repelling skin and is probably the smallest backboned animal that can walk on water. **Page 94** 1) False. Male honeybees are called drones and they stay near the hive. 2) False. Some kinds of bee, such as bumblebees, hibernate in the winter, but honeybees stay busy in the winter months. 3) True. Sugar-rich nectar is used to make honey. This provides the bees with energy. Pollen contains lots of protein and is needed to help the eggs grow into new bees. **Page 97** 1) There are other kinds of insects that feed on dung, but they don't bury it. If there were no dung beetles there would be more piles of dung on show! 2) Their legs are edged with special "teeth"—a bit like a garden rake. This helps them make the dung into a ball. 3) Moms of some kinds of dung beetle stay with the baby once it has hatched from its egg, to keep it clean. **Page 99** 1) No, the queen produces a chemical perfume that stops all her workers from breeding and laying eggs of their own. 2) Winged queens and drones (male ants) emerge from the

nest about once a year—usually during warm, humid weather. They do so to mate and produce new colonies. 3) No. There are more than 10,000 different species of ants, and they vary a lot in their behavior. Army ants are aggressive meat-eaters that eat small animals. **Page 101** 1) False. Once a baby louse hatches, the empty egg turns white. These empty cases are called "nits." 2) False. Lice seem to have no preference between clean hair and dirty hair. 3) True. They can crawl out of one person's hair and into another's if the heads touch. **Page 103** 1) Yes, some spiders spin silken cocoons to lay their eggs in. Other tiny spiders fire a silk thread into the air and wait for it to be caught by the wind, carrying them with it. 2) The Darwin's bark spider from Madagascar can spin webs up to 82 ft (25 m) long. They can even stretch over rivers! 3) Complicated webs made from many sheets of silk that build up in size over time. **Page 104** 1) True. Because slugs do not have the protection of a shell, many prefer to stay sheltered underground or beneath logs. 2) True. Garden snails eat the leaves of plants. 3) True. Some kinds of snail live in the sea and most of those breathe using gills. **Page 107** 1) No, only female mosquitoes drink blood. Male mosquitoes feed on nectar from flowers. 2) Yes, in some countries certain kinds of mosquito spread dangerous diseases, such as malaria and yellow fever. 3) When a mosquito bites, it injects a chemical that helps the blood flow freely. Our body reacts to this chemical, making the bite feel itchy. **Page 108** The female Queen Alexandra's birdwing, a type of butterfly, has a wingspan of up to 11 in (28 cm). Two moths, the Atlas moth and the white witch, have wings about the same size.

**Page 111** 1) Some big tarantulas can produce a hissing sound by rubbing the bristles on their legs. Some snakes can make a sound by rubbing the scales of their skin together. 2) No, different kinds of grasshopper produce different chirping sounds. 3) The cicada, a type of bug, has a buzzing song that is possibly the loudest sound made by any insect. **Page 115** 1) Geckos climb to reach their prey, such as insects. 2) No, some geckos live in habitats where climbing is not useful, such as in deserts. 3) The name comes from the chirping call of some kinds of gecko, which sounds like they are saying "gecko." **Page 117** 1) No, most relaxed chameleons are green or brown to blend in with their surroundings and only change color when they get excited. 2) Some other kinds of lizards use crystals to change color in the same way as chameleons. **Page 118** 1) Apart from a few kinds that eat eggs, all snakes kill living, moving prey. 2) Yes, rattlesnakes and some vipers have special sensors that can detect the body heat coming from warm-blooded prey. **Page 120** 1) Yes. 2) Wild axolotls are threatened with extinction, mainly due to the effects of pollution. **Page 122** The bombardier beetle. **Page 124** 1) False. Some kinds of poison dart frogs are more dangerous than others. 2) True. They can lose their poison in captivity when they are not fed the specific insects that are responsible for making them poisonous. **Page 127** Albatrosses. **Page 128** 1) Yes, the most northerly reptile is the viviparous lizard, which even reaches inside the Arctic Circle. 2) Most stay close to the warm surface in tropical regions. However, leatherback turtles can produce heat in their muscles, which helps them to live in colder parts of the

ocean. 3) Most animals, including amphibians, fish, and insects, are "cold-blooded." Birds and mammals (including us) are "warm-blooded." **Page 130** 1) Snakes and lizards have hard, dry scales that protect their skin, instead of slime. 2) Yes, the slime produced by humans is called mucus. When we sneeze it comes out as snot! 3) No, slime is sticky, so the entire surface of the frog stays protected by it, even when it swims in water. **Page 133** 1) False. 2) True. The saltwater crocodile is the only kind of crocodile that regularly swims out into salty seawater. It gets rid of some of the extra salt in its tears. 3) True. Some animals, including crocodiles, have third eyelids. They blink across the eyes to protect them and to help spread moisture.



## Questions

1. Which bird has the **biggest bill** in relation to its body size?



2. Do centipedes really have 100 legs?

3. Which animal produces **square poop**?



4. How do rattlesnakes rattle?

5. Which bird can **fly backward**?

7. How many **hearts** does an **octopus** have?

6. Aside from humans, which other animal **sleeps on a mattress**?

9. Which animal lays the **biggest eggs**?

8. Can all cats **purr**?

10. The **fathers** of which animal get **pregnant**?



## Quiz your friends!

Who knows the most about the animal world? Test your friends and family with these tricky questions.



## Answers

1. Toucan



2. They have **30 to 382 legs**, depending upon species—but none has exactly 100 legs.



3. Wombat



4. Their tail has **extra-fast muscles** for shaking hollow, rattling scales at its tip.



5. Hummingbird



6. **Orangutan.** It builds a soft sleeping platform from leaves and twigs.

7. **Three.** Two are for pumping blood through the gills, and the third pumps blood to the other organs.

9. Ostrich



8. **Big cats—tigers, lions, jaguars, and leopards—cannot purr, but roar instead.**

10. **A seahorse father** collects fertilized eggs into his pouch so they can grow there until he “**gives birth.**”



# Glossary

## **Algae**

plantlike living things. Many are tiny and live in water

## **Amphibian**

back-boned, cold-blooded animal with moist skin. Frogs, newts, and salamanders are amphibians. Most live on land, but breed in water

## **Antennae**

“feelers” on the heads of certain kinds of creepy-crawlies

## **Camouflage**

the way the appearance of an animal, such as its color or shape, helps it to blend in with its surroundings

## **Carbon dioxide**

gas that animals produce as a waste product. Animals get rid of carbon dioxide by breathing it out using lungs or gills

## **Carnivore**

meat-eating animal

## **Cell**

tiny unit that is the basic building block of all living things

## **Cold-blooded**

reptiles, amphibians, fish, and creepy-crawlies are described as cold-blooded. This is because their body temperature varies, from cold to warm, with the temperature of their surroundings

## **Coral**

animal that lives in a large group, called a colony, attached to the bottom of oceans or seas

## **Digestion**

the way the body of an animal breaks down food so it can be carried to the body’s cells

## **Echolocation**

process of directing sounds at objects and listening for the echo that bounces back. Dolphins use echolocation to hunt fish in murky water. Bats use it to track flying insects at night

## **Endangered**

when there are so few of an animal left in the wild that it is in danger of dying out altogether

## **Extinct**

when there are no living members of a kind of animal left. For example, dinosaurs are extinct

## **Gill**

part of the body used by some animals, such as fish, to breathe underwater. Oxygen in the water moves into the blood in the gills

## **Gland**

part of the body that produces substances that are useful to the animal—such as sweat for cooling the skin, or spit for helping to digest food

## **Habitat**

where an animal or plant normally lives

## **Herbivore**

plant-eating animal

## **Hibernation**

process where animals shut down their body systems and go into a deep sleep-state over winter. Hibernation is a useful way of surviving when temperatures drop and there isn’t much food available

## **Invertebrate**

an animal without a backbone. Creepy-crawlies are all invertebrates

## **Mammal**

back-boned, warm-blooded animal, usually with furry skin. Humans, lions, and whales are all examples of mammals. Mothers of all mammals feed their young with milk

## **Marsupial**

mammal that gives birth to especially tiny young, which are usually kept in a mother’s pouch during the early stages of growth. Kangaroos and koalas are examples of marsupials

## **Migration**

when animals travel between different places at regular intervals. This is usually to reach feeding or breeding grounds

## **Monotreme**

mammal that lays eggs. The platypus and echidna are the only two kinds of monotremes

**Muscle**

part of the body that contracts (shortens) to cause movement. Some muscles are part of organs—such as the heart. Others are attached to the skeleton

**Nerve**

fiber in the body that carries electrical signals. Some nerves carry signals to the brain. Others carry signals to muscles to make them contract

**Nocturnal**

an animal that is active at night and sleeps during the day

**Omnivore**

an animal that eats both plants and animals

**Organ**

part of the body that performs a particular job. For instance, the heart is an organ for pumping blood

**Oxygen**

gas needed to support life. Animals get oxygen by breathing it in using lungs, gills, or their skin

**Paralyze**

animals are paralyzed when their muscles stop working, so they cannot move. Some animals produce a venom that paralyzes their prey

**Pheromone**

chemical scent released by an animal to signal a message to other animals of the same kind. For example, to warn others of danger

**Placental**

type of mammal that keeps babies in its womb so they can grow bigger before they are born. Placentals include humans, mice, and elephants

**Plankton**

tiny animals and plants that swim or float in the water of the sea or a pond. Some can only be seen clearly with a microscope

**Polyp**

living creature that joins with many others of its kind to form a coral reef. Each polyp has stinging tentacles for grabbing prey

**Predator**

animal that kills another living thing for food

**Prey**

animal that is killed by a predator and used as food

**Queen**

egg-laying female in a colony of certain types of insects, such as bees, ants, or termites

**Reef**

large rocky structure, usually around tropical coastlines, formed by the growth of coral

**Reptile**

back-boned, cold-blooded animal with dry, scaly skin. Turtles, lizards, snakes, and crocodiles are reptiles and most lay eggs on land

**Sea anemone**

soft-bodied animal in oceans and seas that has stinging tentacles to catch small animals

**Scavenger**

animal that gets its food by eating the leftovers of other animals

**Tusk**

long tooth, which often extends out of the mouth. Elephants and walruses have tusks

**Ultraviolet**

type of light that can only be seen by certain kinds of animals—for example, bees. Humans cannot see ultraviolet light

**Venom**

chemical that a biting or stinging animal uses for hunting or defense

**Vertebrate**

animals with a backbone. Fish, amphibians, reptiles, birds, and mammals are vertebrates

**Warm-blooded**

mammals and birds are described as warm-blooded. This is because their body produces enough heat to keep them warm, even when the surroundings are cold

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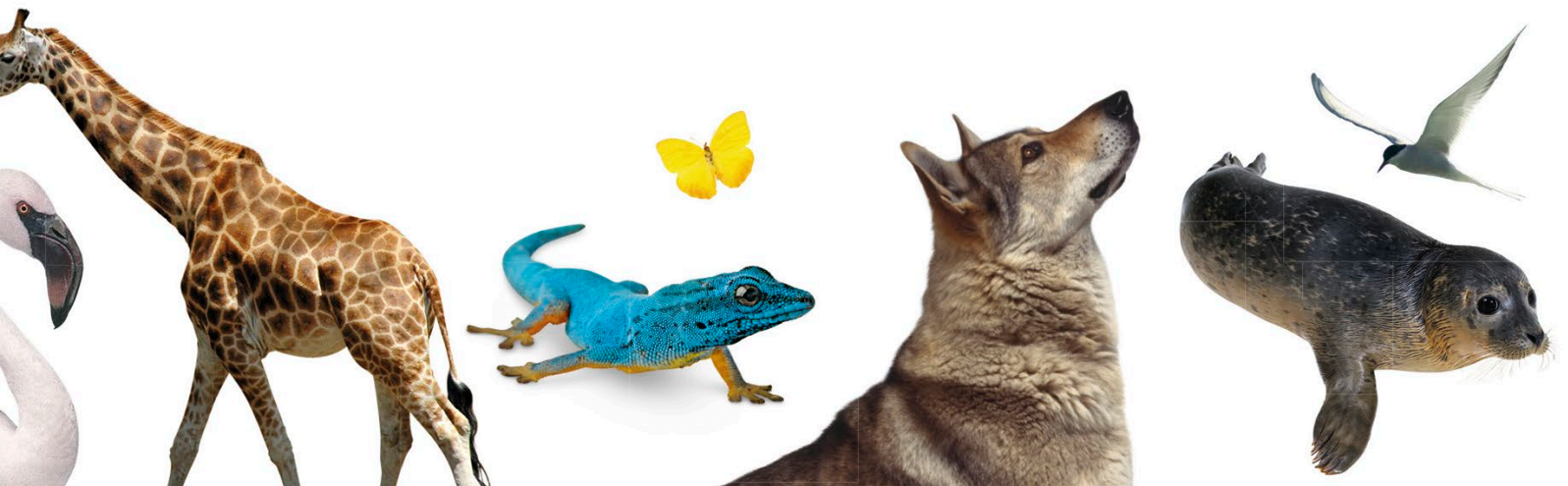
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