

The  
**NATURE  
YEAR**

**A year in the life of the Earth**

# THE WORLD IN JANUARY

**I**N THE NORTHERN hemisphere, the shortest day of the year has come and gone. Although there are more hours of daylight than there were last month, temperatures are the coldest of the year. Meanwhile, the southern hemisphere basks in the warmth of high summer.

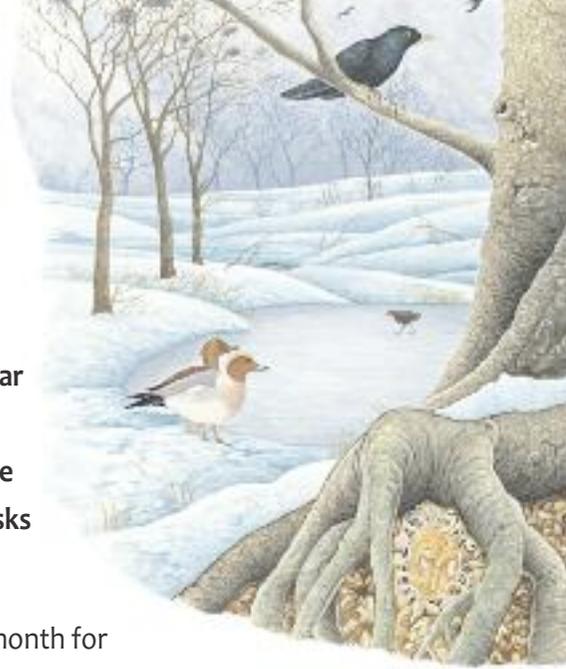
In much of the northern hemisphere, January is a long, hard month for wildlife. Animals' fat reserves, built up in warmer months, are now dwindling. Even the squirrel, which stores food for the winter, may find its supplies running low. This is the start of the "winter kill", when animals that are weak or ill are likely to die.

*A dormouse hibernates through the winter. Above ground, the land is covered in snow and ponds have frozen.*

In the southern hemisphere, there is an abundance of food, even in the seas off the permanently ice-covered continent of Antarctica. Many animals time their breeding season to fall in January.

In Australia, some kangaroos are giving birth. A newborn kangaroo, called a joey, is only the size of a bean. It crawls up its mother's fur into her pouch and attaches itself to a teat. It stays there for six months, drinking milk and growing.

*Bee-eaters start to leave the river banks in southern Africa where they have been nesting. They must leave before the winter rains arrive and the rising river floods their nests.*



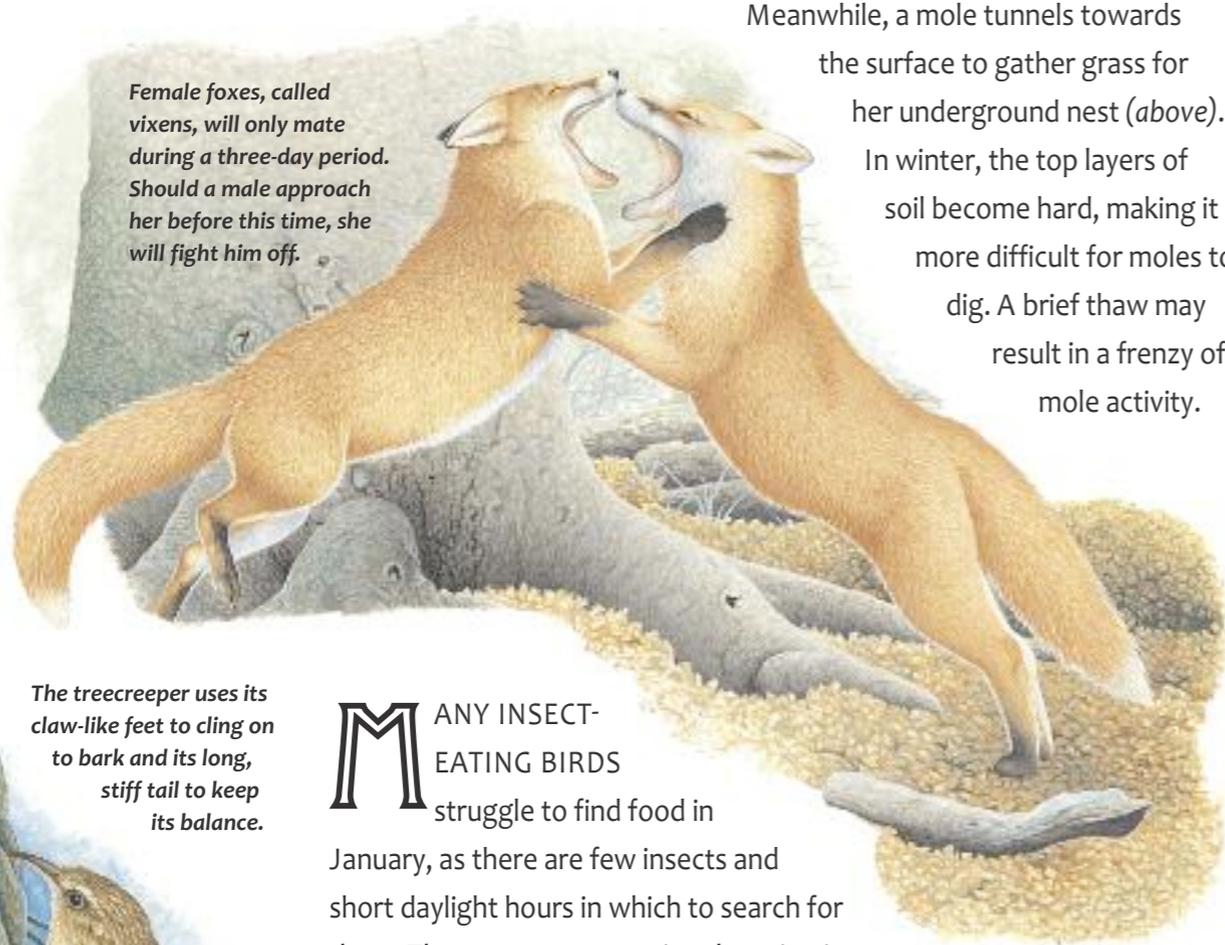
## EUROPE

**J**ANUARY IS THE MONTH when foxes find their mates. They wander around in search of a partner, making loud screams to find one another. After mating, the foxes look for a suitable den, such as a hollow log, or the abandoned burrow of another animal. This is where the female will give birth two months later.



Meanwhile, a mole tunnels towards the surface to gather grass for her underground nest (above). In winter, the top layers of soil become hard, making it more difficult for moles to dig. A brief thaw may result in a frenzy of mole activity.

*Female foxes, called vixens, will only mate during a three-day period. Should a male approach her before this time, she will fight him off.*



*The treecreeper uses its claw-like feet to cling on to bark and its long, stiff tail to keep its balance.*

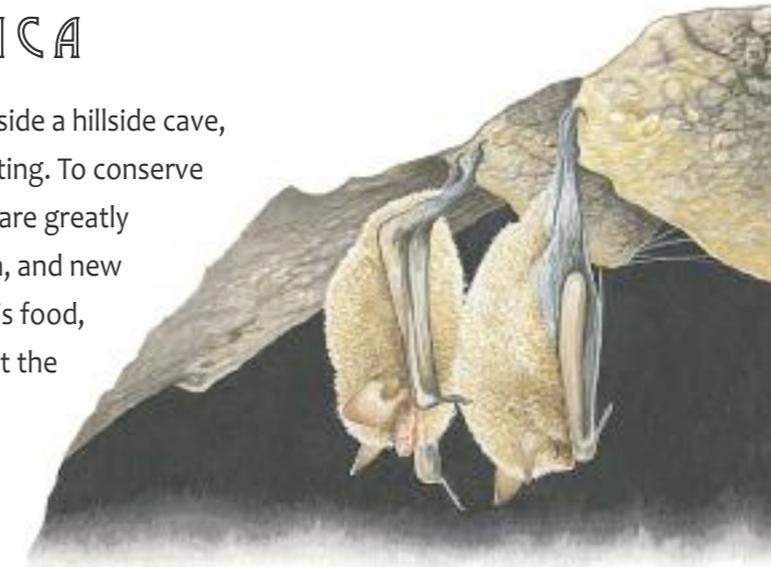
**M**ANY INSECT-EATING BIRDS struggle to find food in

January, as there are few insects and short daylight hours in which to search for them. The treecreeper survives by using its curved, slender beak to probe beneath tree bark for insects that gather there in winter. Treecreepers seek shelter from the cold themselves by hiding beneath strips of bark or inside natural holes in a tree trunk. Some even use their beaks to scrape out hollows in softwood trees. They can fit their slender bodies into incredibly tiny spaces.



## NORTH AMERICA

**E**AST OF THE ROCKY MOUNTAINS, inside a hillside cave, a colony of pipistrelle bats are hibernating. To conserve energy, their breathing and heart rate are greatly reduced. The bats' insect prey died in autumn, and new insects will not hatch until spring. Without this food, the bats must hibernate to survive winter. But the bats do not sleep all winter long. They may awake if the cave warms up a little, or just to stretch their wings and have a drink.



*A California ground squirrel is waking from its three-month sleep. Hibernation is essential but can be dangerous. Many squirrels die from starvation or are found by predators. Those that survive must find food as soon as they wake up.*

**O**N A SNOWY PLATEAU in the Rocky Mountains, a herd of bison come to feed around a hot-water spring. The water is heated by hot rocks deep inside the earth. The springs warm the ground, enabling grass to grow here, despite freezing temperatures. Bison and other grazing animals gather round the springs each winter. Once they have stripped the region of plants, they move on in search of food elsewhere. Bison are well-adapted to the cold, with thick winter coats and broad noses for shovelling snow to reach the grass beneath it.



*Steam may condense and freeze in the bison's fur, forming tiny icicles.*



## ANTARCTICA

**O**N ANTARCTIC coasts, it is the breeding season. Wandering albatrosses settle in large colonies and build mud-and-grass nests close together (*below*). In early January, females lay a single large, white egg. Both parents take turns to sit on the egg until it hatches 11 weeks later.

Breeding colonies of seabirds

*A chinstrap penguin chick left unguarded for a moment makes an easy meal for a great skua.*

attract great skuas and other predators. They prey on the eggs and chicks of smaller birds, including penguins. With such a surplus of food, the skuas can now feed their own chicks.



## SOUTH ATLANTIC

**T**HE GREEN TURTLES of Brazil usually stay in their home waters, close to the coast. But every few years, they make long journeys back to the breeding grounds where they were born. In January, many turtles head east, on a dangerous journey of over 2300 kilometres to the tiny island of Ascension in the Atlantic Ocean.

*Green turtles follow ocean currents to help them find their way. As they swim, they must rise to the surface every few minutes for air. It takes the turtles between five and seven weeks to complete their journey.*

## SOUTH AMERICA

**A**T THE HEIGHT of the hot, dry summer in South America, parts of the Amazon River are reduced to a shallow trickle. Fish now find themselves trapped in small pools

of water. Surrounded by predators, such as caymans, jaguars and fish-eating birds, the fish have no escape.

The low water also exposes banks and sandbars along the river. These provide ideal nesting sites for animals such as turtles and black skimmer birds. There is plenty of food for the young, but they must raise their families quickly, before the waters rise again.

Millions of butterflies gather on the wet sandbars to suck water, salts and minerals from the mud. This replenishes their supplies and keeps them healthy.

*Tiny fish and other animals shelter in leaves that collect at the river's edge. Some can hide here until the rains return and water levels rise again.*



## NEW GUINEA

**I**N THE TREETOPS of New Guinea, a green tree python watches over her clutch of eggs. She has not eaten since she laid her eggs two months ago. As soon as the young hatch, she will abandon them and go in search of food for herself.

The young snakes are independent from the moment they

hatch. At first, they are bright yellow, but their colour gradually changes as they grow. By the time they are six months old, they will be the same bright green as their mother.

*The first green tree python hatchlings emerge from their soft-shelled eggs.*



# THINGS TO DO

Identifying animal tracks is a great way to see which animals pass through your garden or local park. Look for footprints in muddy ground, on wet sand or in fresh snow.



Fox

**Mouse** How many toes can you see? Are there any claw marks? Dogs and cats both have four toes, but only members of the dog family, such as foxes, leave claw impressions.

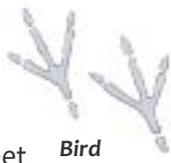


Rodents, such as mice, have four toes on their front feet and five on their hind feet. Weasels and badgers have five toes on both their front and hind feet. Deer have just two toes.



Deer

**Rabbit** Prints left by a walking or trotting mammal show each foot being placed in front of the other and to the side. A bounding animal, such as a rabbit, leaves a triangular pattern as its hind feet land ahead of its front feet. Small birds hop along leaving two prints side by side.



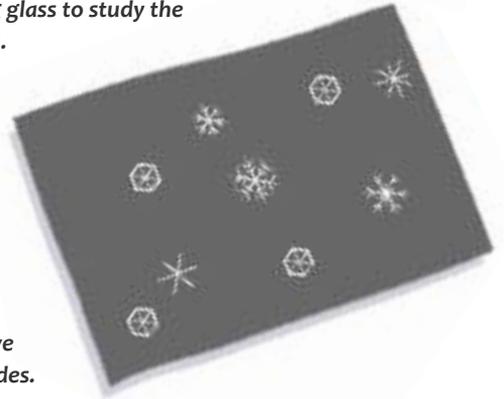
Bird

*Wet ground beside ponds or streams are ideal places to look for tracks.*

Try catching snowflakes to get a closer look at them. Place a piece of black paper in the freezer. When it starts to snow, lay the paper on something flat and hold it in the snow until it is lightly covered with snowflakes (this will not work in strong winds). Use a magnifying glass to study the snowflakes.



No two snowflakes are exactly alike, but they all have six equal sides.



## NATUREWATCH

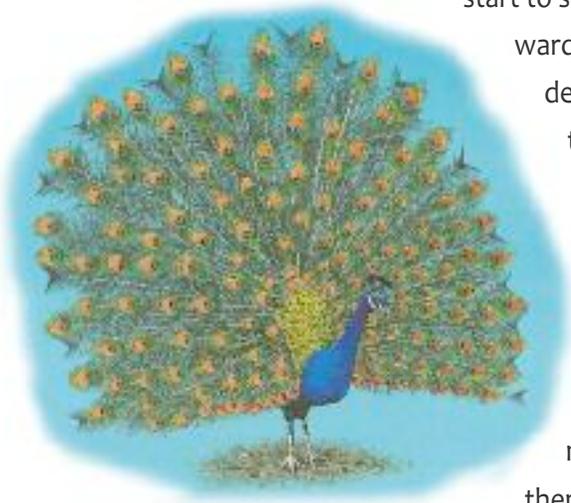
	Animal tracks in the snow	10
	New shoots	20
	Old bird's nests in trees	30
	Frosted spiderwebs	40
	Molehills	50

How many of these things you can spot? Award yourself the points on the right!

# THE WORLD IN FEBRUARY

**T**HE WEATHER IN THE northern hemisphere is still cold, but as the month wears on, the snows melt and flowers start to grow. The southern hemisphere is still enjoying warm weather, with many animals mating or raising their young.

In temperate regions across the north, new life starts to appear: a few green shoots poke their heads above the earth; the first of the winter's hibernators emerge and birds start to stake out their spring nesting territories, using song to ward off rivals. The first blooms of the year include the delicate snowdrop and the colourful crocus. These typically grow in clusters around the base of trees.



In India, while northern regions are still in the depths of winter, it is warm in the south. Many species, such as the peafowl, have already started to mate. The female chooses her mate according to the size and colour of his tail feathers and the number of eyespots on them (*left*).

After a long journey across the Atlantic Ocean, a green turtle finally reaches the shores of Ascension Island. In the warm shallow waters, she mates with a male before crawling ashore to lay her eggs. This may well be the beach where she herself hatched out. High up the beach, out of the reach of tides, she uses her strong front flippers to dig a pit in the sand. Here she lays between 100 and 200 eggs (*right*). She covers them with sand and heads back to the sea.



## EAST ASIA

**W**INTERS IN the mountains of northern Japan can be harsh, with snow on the ground for several months. Even with their thick fur, Japanese macaques struggle to stay warm. Some leave the mountains and head to sheltered valleys where the weather is milder. But in Jigokudani, or “Hell’s valley”, the monkeys have found an ideal solution: they bathe in natural springs, warmed by heat deep inside the Earth (*below*).



Some eagles perch on ice floes as they search the water for fish, while others patrol from the air. Most birds settle back on the ice to enjoy their meals.

At the same time, a pair of red-crowned cranes are courting in southern Japan. The couple dance, spinning, bowing and jumping into the air, a ritual that will bind them together for years (*above*). Elsewhere, young cranes, not yet old enough to breed, practise their dancing.

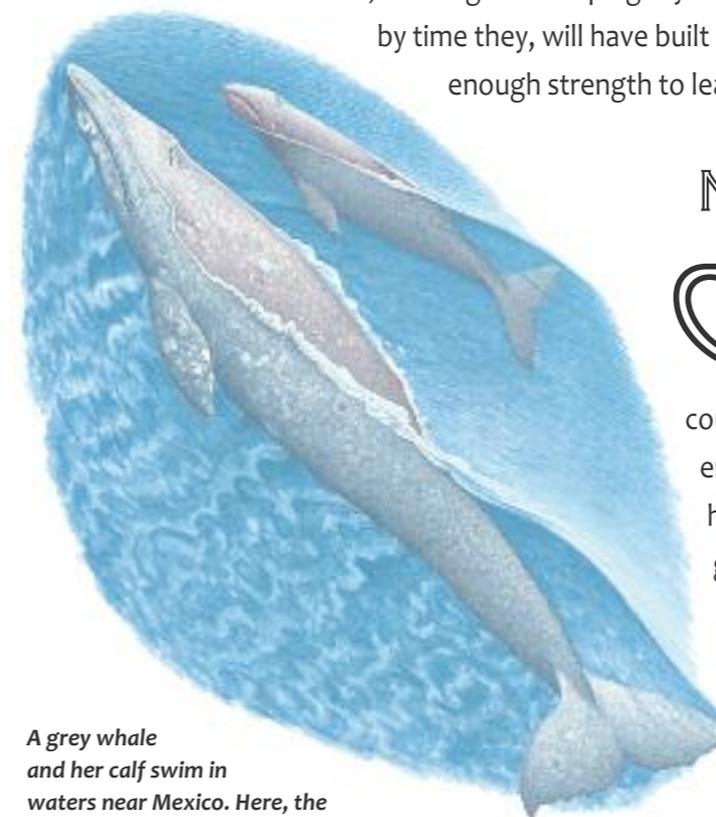


**E**ACH WINTER, Steller’s sea eagles leave their breeding grounds in Russia and head south towards Japan. The rivers and estuaries where they usually hunt have frozen over, forcing the eagles to fish offshore in open waters. When an eagle spots a fish, it swoops down with its wings raised high and its razor-sharp talons reaching forwards.



## EUROPE

**D**EEP UNDERGROUND, a badger has given birth to two cubs. Just 10 centimetres long, the tiny cubs are naked and blind. They are kept warm by the heat from their mother’s body and by a thick bedding of bracken inside the sett, the badger’s burrow. The cubs will stay in the sett for at least eight weeks, suckling and sleeping. By this time they, will have built up enough strength to leave it.



A grey whale and her calf swim in waters near Mexico. Here, the calf is safe. But soon it will join its mother on the journey to the Arctic.

## NORTH AMERICA

**G**REY WHALES spend the winter in the warm, shallow waters of the Gulf of California, off Mexico. Here, they court, mate and rear their young. At the end of February, the first whales start to head north to their summer feeding grounds in the Arctic. Whales with young are the last to leave. They must wait until their calves are strong enough to make the perilous journey to the Arctic.

**I**N THE HIGHLANDS of Mexico, monarch butterflies are seeing out the winter clustered together on trees in their millions. They have hardly moved for months. Now, on the first warm days of spring, the butterflies start to stir, flying short distances in search of water and nectar.



## SOUTHERN AFRICA

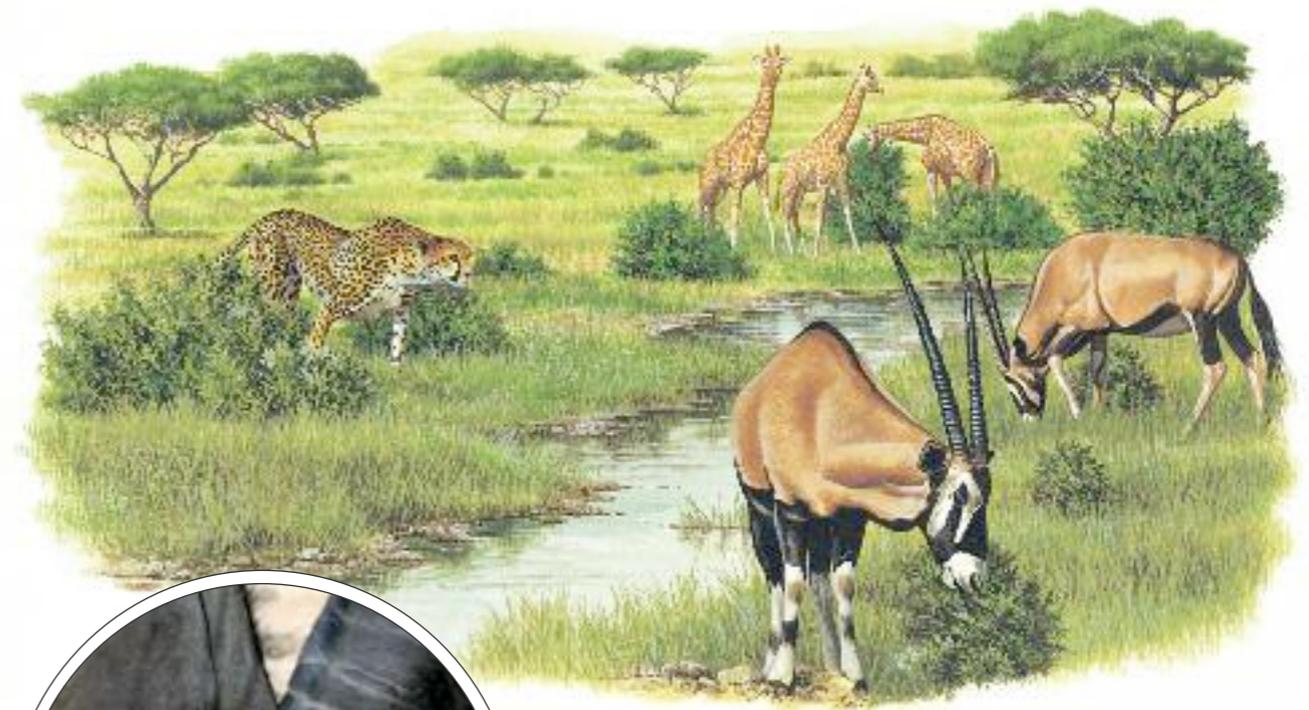
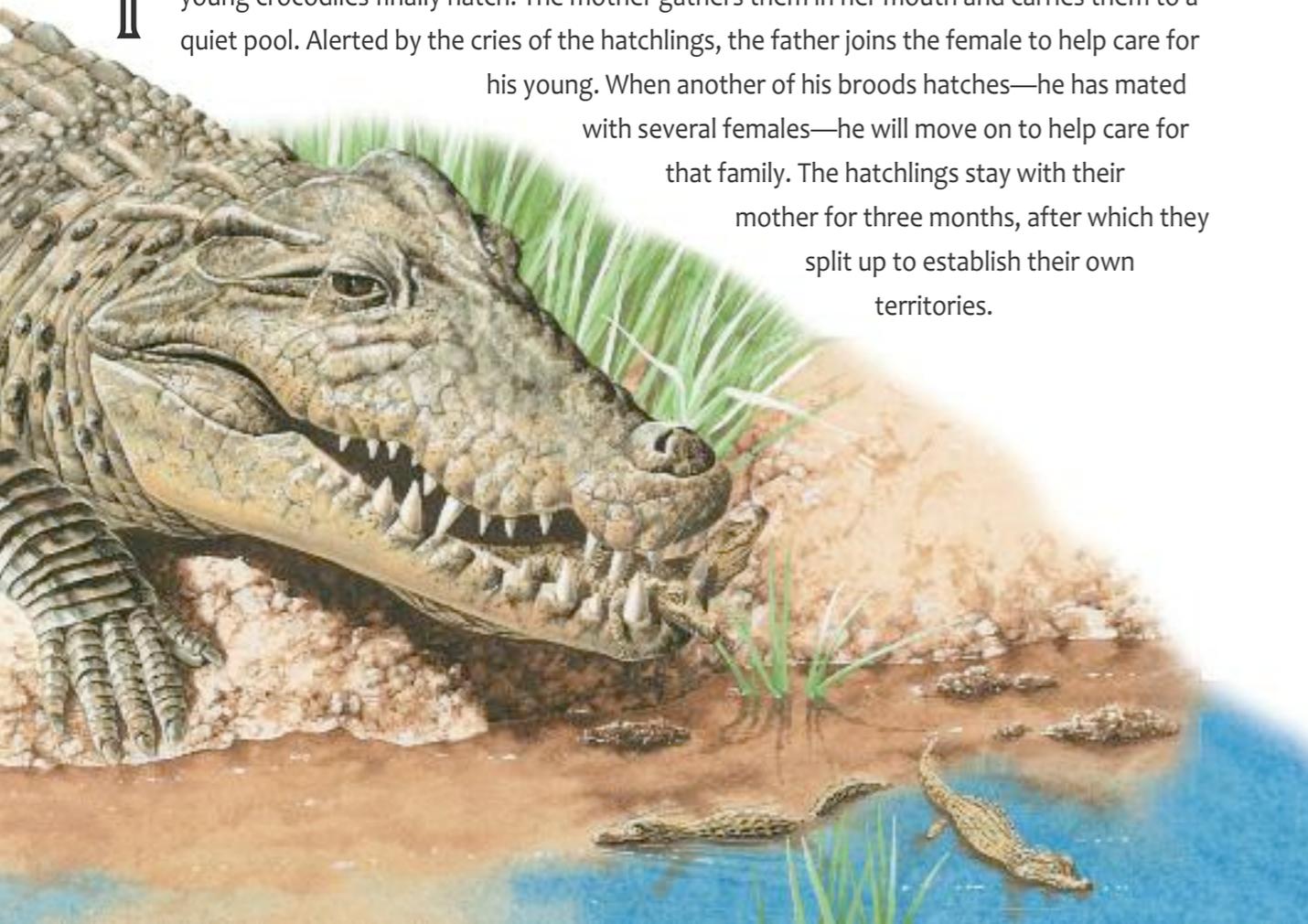
**I**N FEBRUARY, huge flocks of birds swoop over the African grasslands. They are red-billed queleas, following the rains as they sweep across the country at the start of the rainy season. Where the land is drenched, grass seeds are ripening, and the birds can feast. Breeding colonies gather in areas of abundant food. Male queleas weave nests of grass in reeds or thorny bushes.



*Breeding colonies may consist of millions of birds.*

## EAST AFRICA

**F**OR MONTHS, this Nile crocodile has been guarding her clutch of eggs. In February, the young crocodiles finally hatch. The mother gathers them in her mouth and carries them to a quiet pool. Alerted by the cries of the hatchlings, the father joins the female to help care for his young. When another of his broods hatches—he has mated with several females—he will move on to help care for that family. The hatchlings stay with their mother for three months, after which they split up to establish their own territories.



*Cape buffaloes battle for mates in southern Africa. Males charge at each other head on and lock horns.*

## SOUTHWESTERN AFRICA

**F**OR MUCH OF THE YEAR, the Kalahari is a semi-arid desert, with only patches of dry grasses and low shrubs growing on the parched ground. But in February, the rainy season starts: dry riverbeds fill with water and the desert is transformed into a paradise of lush vegetation. Grazing animals such as gemsbok, wildebeest and giraffe come from far and wide to feed on the young, sweet plants. They are followed by predators such as lions and cheetahs.

## MADAGASCAR

**M**OVING THROUGH the forest at night, an aye-aye uses its huge, bat-like ears to listen for insect grubs, and its long, thin fingers to scrape them out from under bark. Clinging to its mother's back is a tiny aye-aye, just days old.



# THINGS TO DO



**H**old a piece of white paper against a tree trunk with one hand and rub a wax crayon over the paper, using long, smooth strokes.

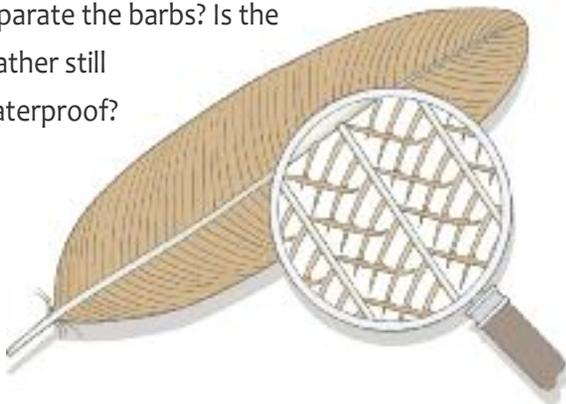
When you get home, wash watery paint over the rubbings to see them more clearly.

Stick in a fallen leaf from beneath the tree to help you identify which species it is.

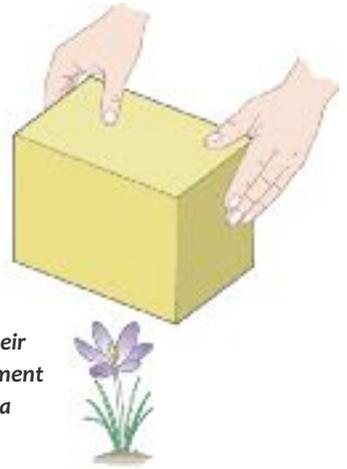


**F**ind a feather on the ground.

Tap a little water on to it. See how the water drop rolls off the feather? This happens because the feather is made up of hair-like structures called barbs, which are coated with a waterproof substance. The barbs are joined together by tiny hooks called barbules. Birds use their beaks to make sure the barbs are hooked together. What happens if you separate the barbs? Is the feather still waterproof?



*All plants respond to light. They even move slightly throughout the day to follow the sun. Most flowers close their petals at night to protect themselves from the cold and to keep their pollen dry. Here is an experiment to show this behaviour over a much shorter time span.*



**Cover a crocus with a box.**

*Five minutes later, remove the box.*

*The crocus will have already closed its petals.*

*You can watch as they open up again. They will do so quite quickly if the sun is shining.*



## NATUREWATCH

	Snowdrops	10
	Catkins on branches	20
	Lichen on a tree	30
	Owl pellets	40
	A snail asleep in its shell	50

How many of these things you can spot? Award yourself the points on the right!

# THE WORLD

## IN MARCH

**I**N THE NORTHERN half of the world, periods of mild weather break up the cold. More spring flowers appear and, on warmer days, hibernators start to emerge. In the southern hemisphere, autumn has arrived. Young animals, born in the height of summer, race to put on weight before winter.

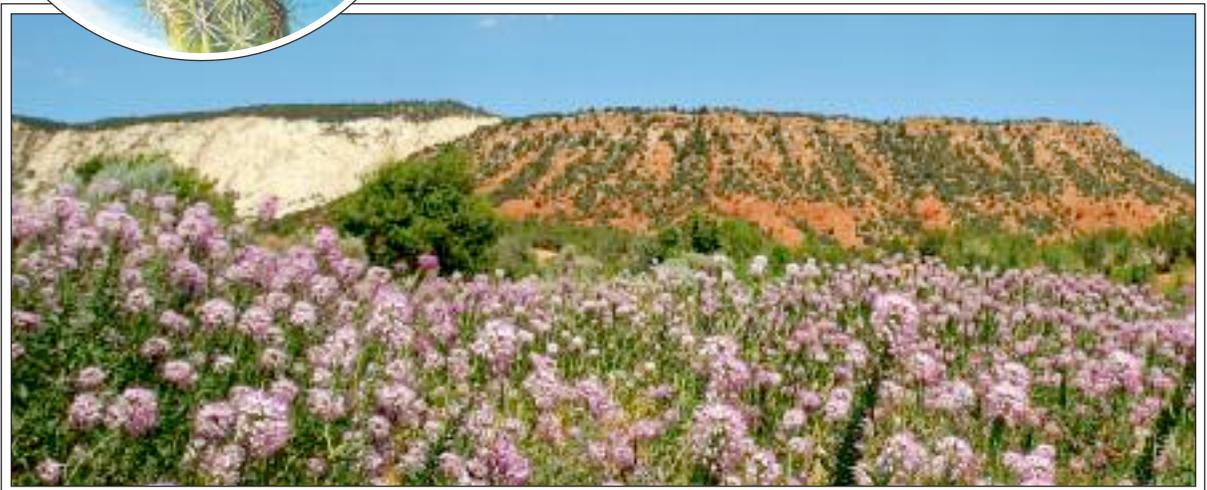
In the northern hemisphere, the days are becoming longer and temperatures are rising. In Europe and North America, some animals emerge from their winter hibernation. After months without food, their fat reserves are running low, and it is crucial that they eat before long. They may even need to retreat to their burrows if temperatures drop again.



*A queen bumblebee emerges from hibernation and sips nectar from a willow catkin.*



With the arrival of spring, California's Colorado Desert bursts into bloom (*below*). Darting between the flowers are hummingbirds and butterflies, which feed on the flowers' nectar. Among them, a Costa's hummingbird hovers over a cactus, dipping its tiny beak into a flower (*left*). It visits up to 1000 flowers a day. It takes all the water it needs from nectar, so it can survive without drinking.



## ARCTIC

**A**FTER MONTHS IN her maternity den, a female polar bear steps into the open with her two cubs. After months without food while suckling her young, she desperately needs a meal. She uses her excellent sense of smell to find a breathing hole—a break in the ice where seals come up for air. Here she will wait until a seal appears.

Meanwhile, on a floating lump of ice, a harp seal pup cries out for its mother. She left her pup



momentarily while she went in search of food. On her return, she recognizes the pup by its cry and scent. The pup feeds on its mother's rich milk up to three times a day, for about two weeks.

*This polar bear must keep a constant look out for danger. Hungry adult males are known to attack bear cubs when other food is scarce.*

It grows quickly in size, building up a thick layer of body fat, called blubber, that will help it survive the severe cold. Until that time, it is kept warm by its soft, white fur—which also helps to camouflage it from predators.



## NORTH AMERICA

**I**N MARCH, bald eagle chicks hatch. Their parents pull strips of meat from their prey and feed them to the youngsters. Sometimes the larger chick may kill its smaller sibling, in order to secure more food for itself. After a month, the chicks will grow their adult feathers.

## EUROPE

**A**FTER TEN WEEKS inside their sett, some badger cubs are about to venture out for the first time. They are still suckling on their mother's milk, but will start to fend for themselves over the next month. First, they must learn how to find food.

Each spring, thousands of starlings leave their wintering grounds in southern Europe and return to Scandinavia. Many

birds stop in

Denmark, to feast

on insects and spiders in

the Tønder Marsh. Each evening they take to the air before roosting. They fly in wave-like formations, bunching together then separating out as they try to evade birds or prey. The flocks are so dense that they sometimes block out the sun completely. This phenomenon is known locally as *sort sol* or the “black sun”.



## CENTRAL ASIA

**O**N THE STEPPES of Central Asia, it is the start of the mating season for great bustards.

The male seeks to attract a mate by displaying his impressive feathers and turning on the spot.

The females watch every male before they pick a mate. Having done so, they stand beside the male of their choice, sometimes plucking at his feathers. A male bustard may mate with up to five females in one season.

*A male bustard gulps down air to inflate an air sac under his throat. This puffs out more of his feathers.*



## AFRICA

**A**TROOP OF around 50 baboons are milling around the open grassland of the savannah. Some forage for grass, roots and berries, while others are busy grooming—picking at each other’s skin to remove parasites. All the females in the troop share the task of caring for the young baboons (*below*). At first the young stay close to their mothers, but as they get older they start to venture further afield.



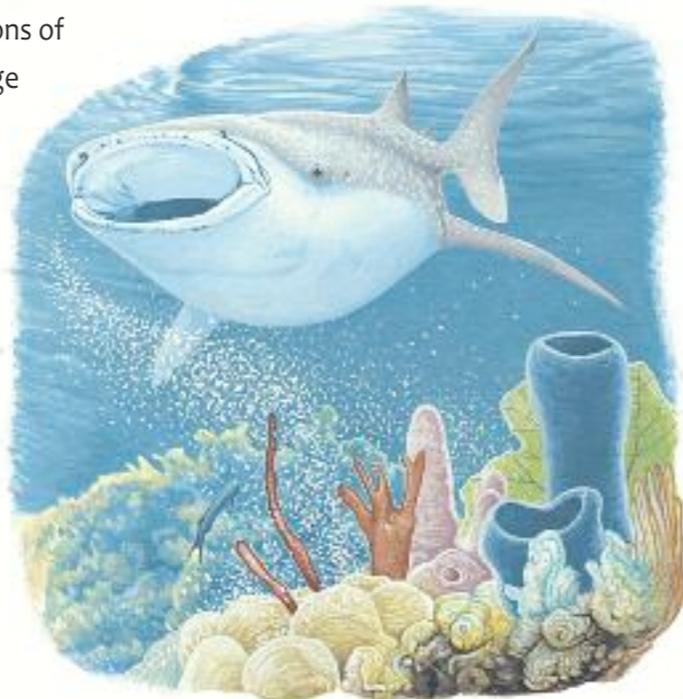
## AUSTRALIA

**A**T DAYBREAK IN AUSTRALIA, a flock of bats gather to roost in a tree (*above left*). March is

the start of the mating season of the grey-headed flying fox, a bat so-called because of its fox-like face. Most mating takes place during the day, when the bats are in their roosts. When night falls, the bats leave to forage for food: pollen, nectar and fruit.

*Male flying foxes establish territories with “harems” of about five females. Males aggressively defend their territory from intruders.*

Meanwhile, on the western coast of Australia, coral polyps are spawning. Coral is formed from the skeletons of tiny animals called polyps, which live in huge colonies. In the Ningaloo Reef, the polyps reproduce at the same time each year, a few days after the full moon in March or early April. The reef waters burst into colour as the corals spawn—releasing eggs and sperm into the waters. This event attracts a number of creatures that feed on the spawn.



*Among the animals that come to the reef to feed is the world’s largest fish: the 12-metre-long whale shark.*

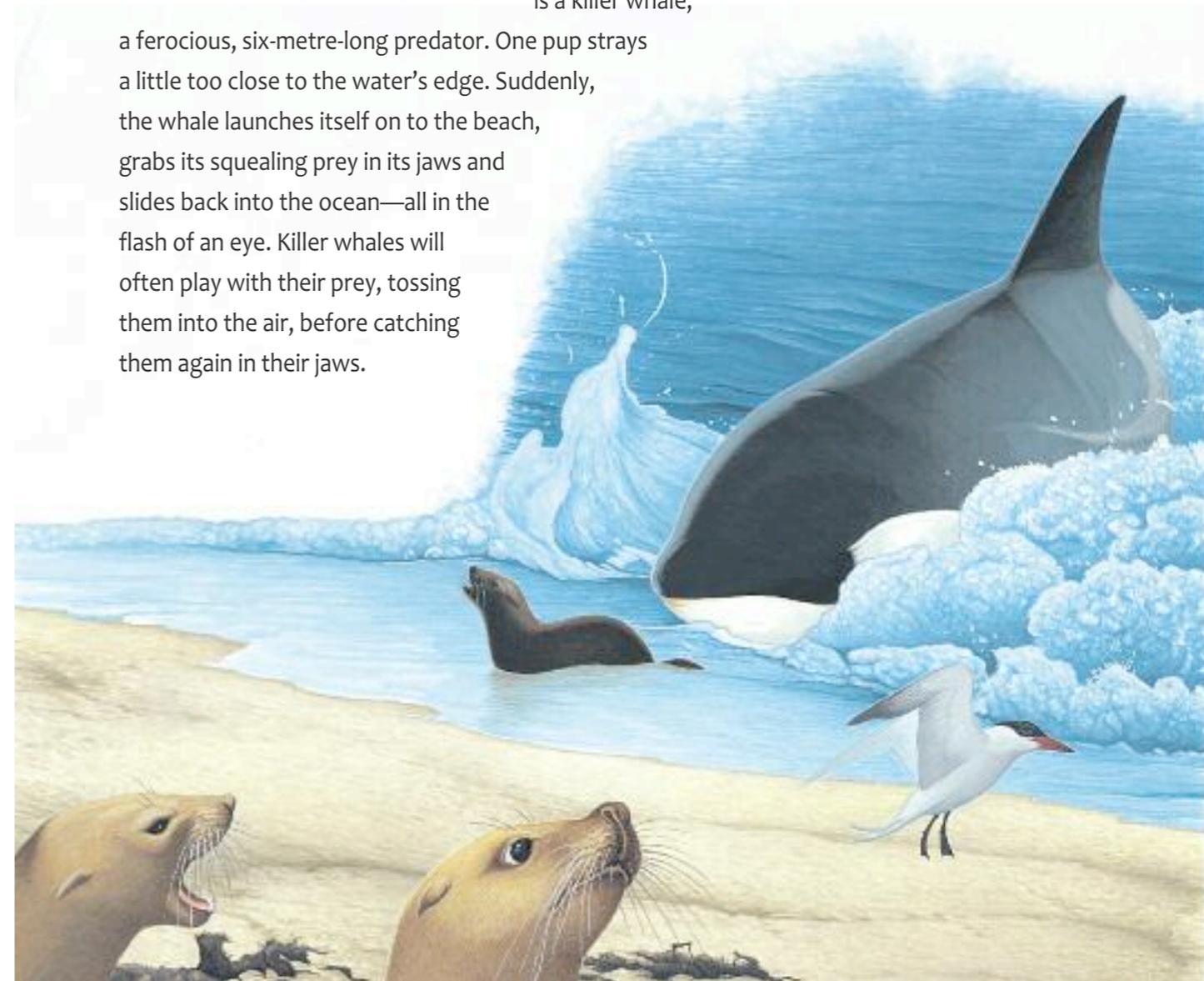
## SOUTH AMERICA

**A**S SNOWS MELT in the Andes mountains and heavy rains fall in the Amazon basin, many of the river’s tributaries flood. Water levels rise up to 10 metres, submerging many plants and even trees. Flood waters enrich the soil and help plants to spread their seeds. The seasonally flooded forest is known as the *várzea*.



Meanwhile, on the shores of southern Argentina, a group of sea lion pups are playing. They are unaware that lurking in the shallows a few metres out to sea is a killer whale,

a ferocious, six-metre-long predator. One pup strays a little too close to the water’s edge. Suddenly, the whale launches itself on to the beach, grabs its squealing prey in its jaws and slides back into the ocean—all in the flash of an eye. Killer whales will often play with their prey, tossing them into the air, before catching them again in their jaws.



# THINGS TO DO



In spring, birds gather twigs, leaves, moss and feathers to build

their nests with. Can you use the same materials to build your own nest?

1 Weave small, flexible twigs into a circle to make the base of your nest. If it feels insecure, line it with mud and leave to harden. For an extra challenge,



try using just one hand (remember, a bird does it all with its beak). You could work alongside a friend like a pair of birds.

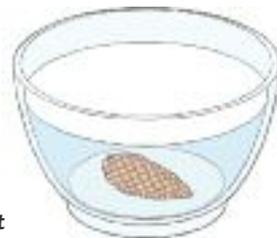


2 Line the inside of the nest with soft materials, such as moss and feathers.

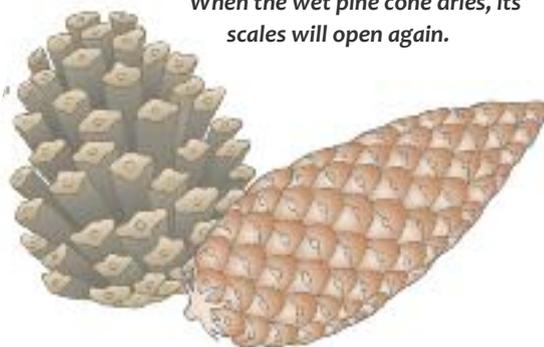
3 Once the nest is made, put it to the test. Look for small objects, such as stones, that can act as eggs. Do they stay in the nest?



Look for two pine cones on the forest floor or under a tree in your local park or garden. Place one in a bowl of water for 10 minutes and keep the other one dry. What difference can you see between the cones?



The wet pine cone will have shut its scales. It does this to keep its seeds dry, so that they can float away on the wind to a spot where they can grow. When the wet pine cone dries, its scales will open again.



## NATUREWATCH

	Primroses	10
	Bird gathering twigs	20
	Frogspawn	30
	Gorse	40
	A bumblebee	50

# THE WORLD

## IN APRIL



**I**N THE NORTHERN hemisphere, spring starts in earnest. Trees and shrubs burst into leaf and more flowers bloom. Meanwhile, autumn arrives in the southern hemisphere. Animals start to prepare for the winter months ahead.



*A sea otter feasts on a sea urchin*

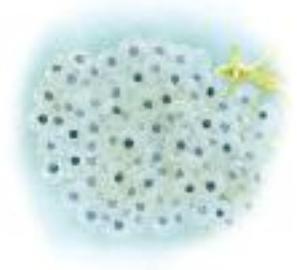
April brings warming sunshine to many northern regions, spurring a burst of animal activity.

*A song thrush brings a worm to her hatchlings.*

As the soil warms up, insects multiply and, with more food about, birds prepare to raise their families. More and more birds arrive from the south and there is a frenzy of nest-building.

Off the west coast of North America, giant leafy “trees” of seaweed, called kelp, sway in the water. Winter storms have swept away swathes of kelp: this enables sunlight to reach the seabed in the spring and trigger new growth. Floating amongst the fronds of kelp is a sea otter (*above*). Lying on its back, it smashes a sea urchin against a stone placed on its belly. With a loud crack, the spiky urchin’s shell breaks open, and the otter tucks into its meal.

*Tadpoles hatch and feed on what is left of their jelly-like eggs, called frogspawn (right). They breathe through openings in the side of their heads called gills.*



On an Indonesian island, a brood of Komodo dragons are hatching (*right*). The tiny lizards are just 30 centimetres long. They quickly scurry up trees to avoid predators, including adults of their own species.

*Komodo dragon hatchlings eat insects and small lizards until they are big enough to leave the treetops and feed on larger prey.*



## EUROPE



**A**FTER WAKING FROM hibernation, a queen bumblebee seeks a suitable place for a nest (left). A simple hole in the ground is ideal. She lines it with grass and starts to make tiny “pots” out of wax, which seeps out of glands on her body. Some pots are used for storing pollen; others are used to hold her eggs.

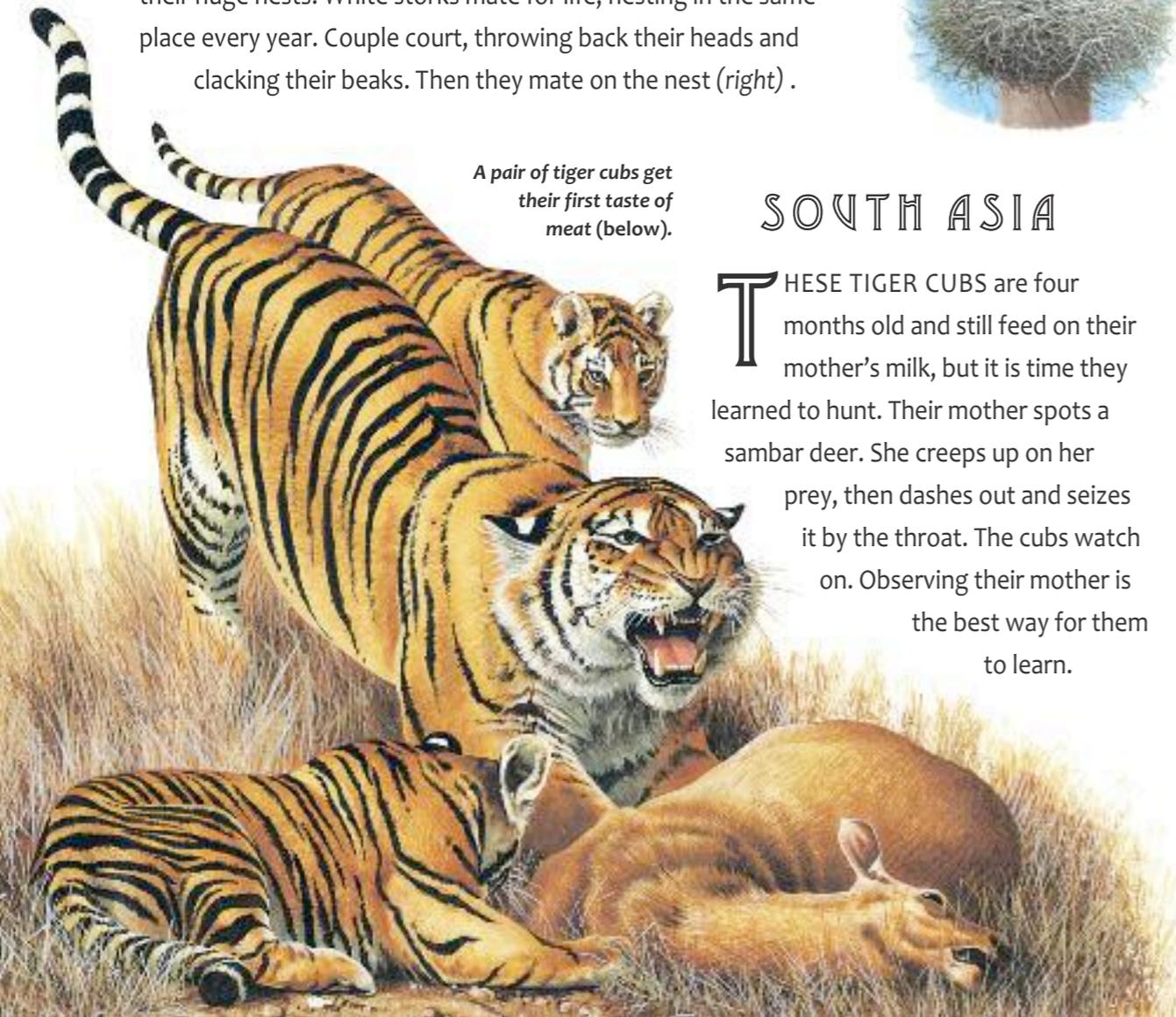
Storks build their nests in high, remote sites, out of reach of predators. Most choose cliff-tops or trees, but chimneys make a good alternative and are wide enough to support their huge nests. White storks mate for life, nesting in the same place every year. Couple court, throwing back their heads and clacking their beaks. Then they mate on the nest (right).



A pair of tiger cubs get their first taste of meat (below).

## SOUTH ASIA

**T**HESE TIGER CUBS are four months old and still feed on their mother’s milk, but it is time they learned to hunt. Their mother spots a sambar deer. She creeps up on her prey, then dashes out and seizes it by the throat. The cubs watch on. Observing their mother is the best way for them to learn.



## NORTH AMERICA

**T**HESE MONARCH butterflies (right) have spent the winter perched on trees across Mexico. With the arrival of spring in April, it is time for them to fly back north, but first they must mate.

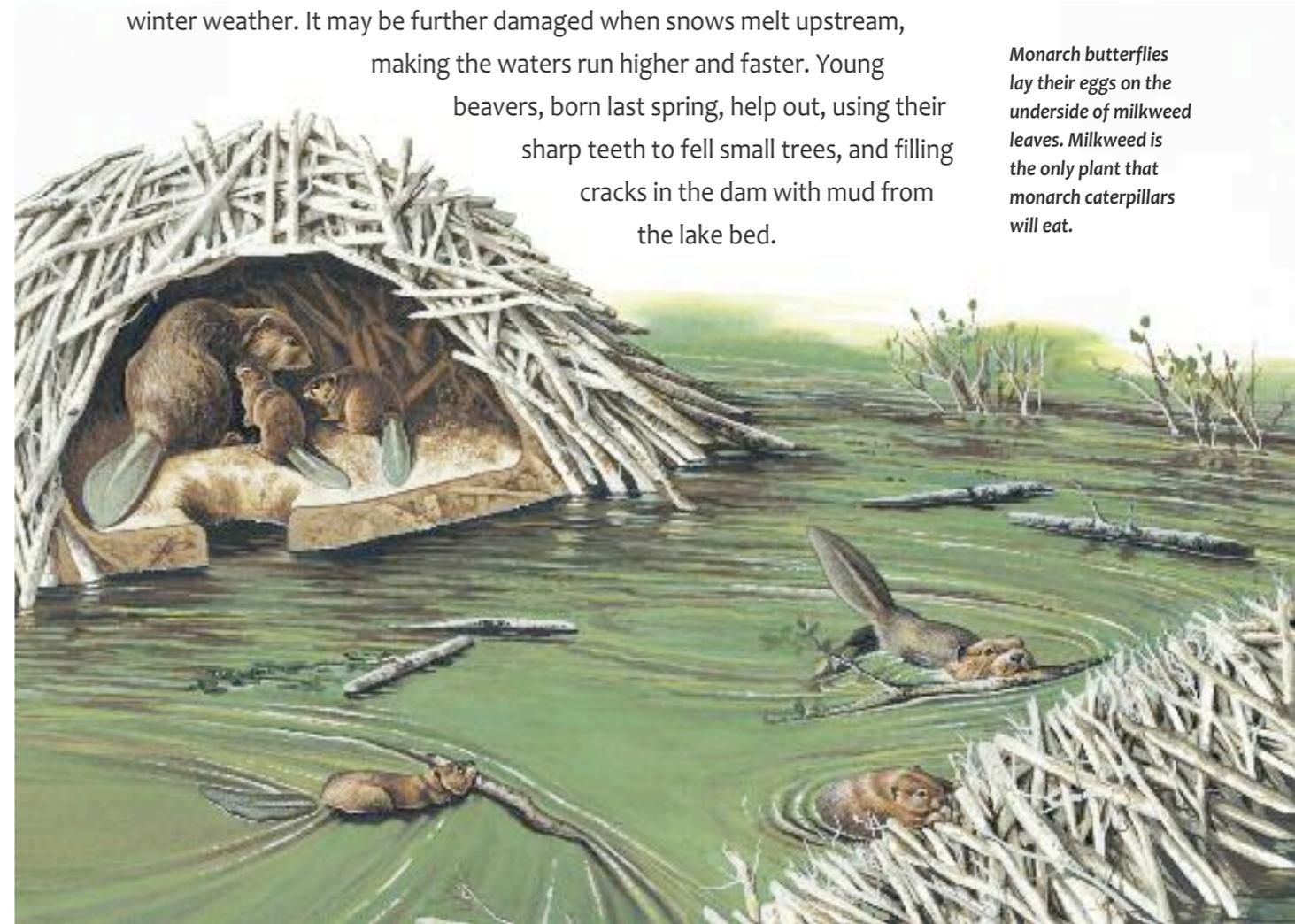
Males pursue females through the air in an elaborate dance, nudging them from behind. If a female accepts a male’s advances, the pair will land on a tree or shrub and mate. Males die soon after mating and females fly north, in search of milkweed plants where they will lay their eggs before they, too, die.



Behind a rough dam of twigs and mud, lies a small lake, diverted from a stream. At its centre is a lodge, a mound of mud and branches that is home to a family of beavers (below). By April, the dam has been weakened by winter weather. It may be further damaged when snows melt upstream,

making the waters run higher and faster. Young beavers, born last spring, help out, using their sharp teeth to fell small trees, and filling cracks in the dam with mud from the lake bed.

Monarch butterflies lay their eggs on the underside of milkweed leaves. Milkweed is the only plant that monarch caterpillars will eat.



## SOUTH AMERICA



**W**ITH THE ARRIVAL of April, many of the Amazon's tributaries flood. As water levels rise, hoatzin birds split into breeding groups and fight over nesting sites.

The best spots are branches that overhang the flood waters. This is so that hoatzin chicks, if threatened, can drop into the water and swim away from danger. They

can later climb back to the nest using the claws at the tips of their wings (*above left*).

These are lost when the birds reach adulthood and learn to fly.

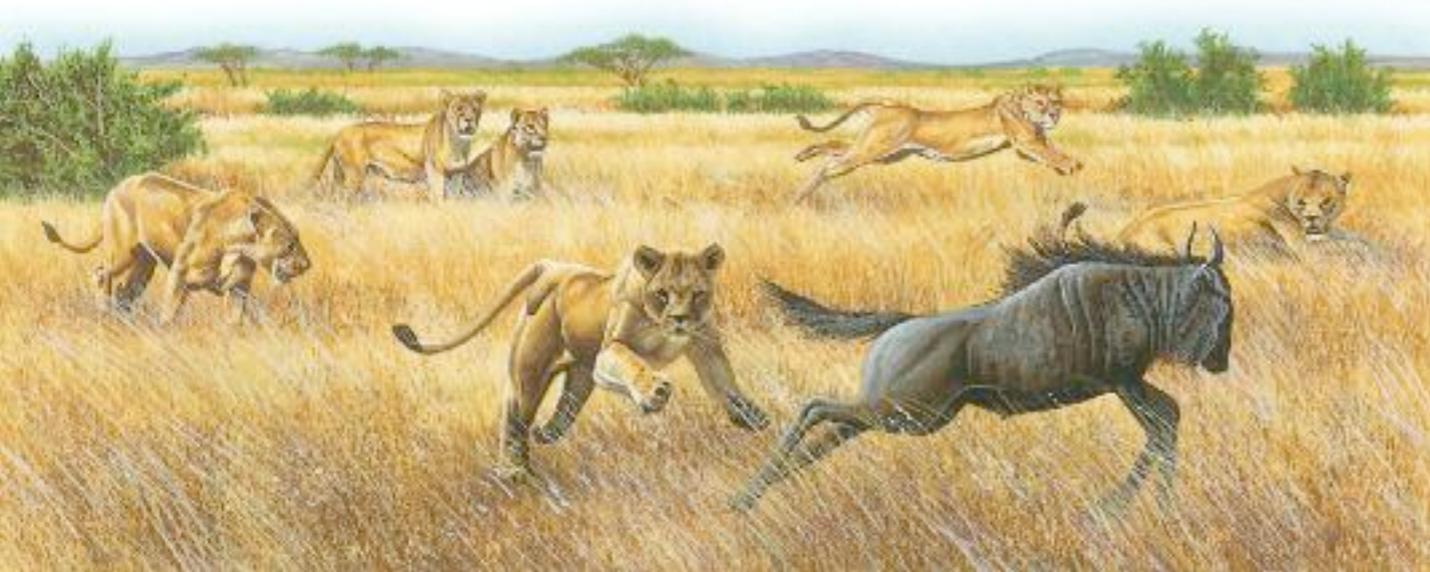


*Each autumn, thousands of sooty terns flock to Bird Island in the Seychelles, east of Africa. They settle in a huge colony in the north of the island to breed and raise their young.*

## SOUTHERN AFRICA

**I**N APRIL, wildebeest start to move north across the Serengeti grasslands in their annual migration. Moving on is essential if they are to find better grazing land, but their journey leads them into danger: hungry lions may be lurking in the long grass.

The hunting is actually carried out by the lionesses. They hunt in packs in order to bring down large prey. First they surround their target. Then one or two lionesses move in for the kill. With all escape routes blocked, the wildebeest cannot escape the deadly trap.



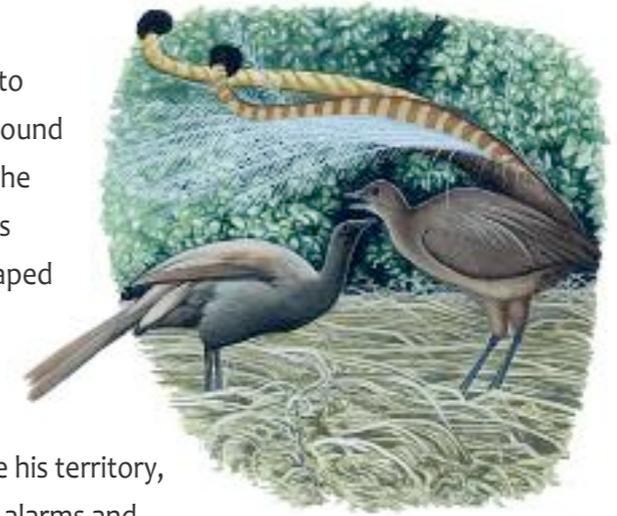
## AUSTRALIA

**I**N A FOREST clearing, a superb lyrebird performs to attract a mate. First, he scrapes together a low mound of earth and twigs to make a platform. Climbing the mound, he spreads his silvery tail feathers and throws them over his head. The fan is framed by two lyre-shaped feathers, after which the lyrebird takes its name.

The male then begins a graceful dance, turning on the spot and singing. He can mimic perfectly the different sounds heard inside his territory, from bird songs to car alarms and

chainsaws. A wide range of sounds tells females that this male is strong enough to have acquired a large territory.

Not far away, a wombat and her youngster forage for food. Across most of Australia, the extreme heat of high summer has started to fade. Finally the wombats can venture out in daylight, without the heat of the day overwhelming them.

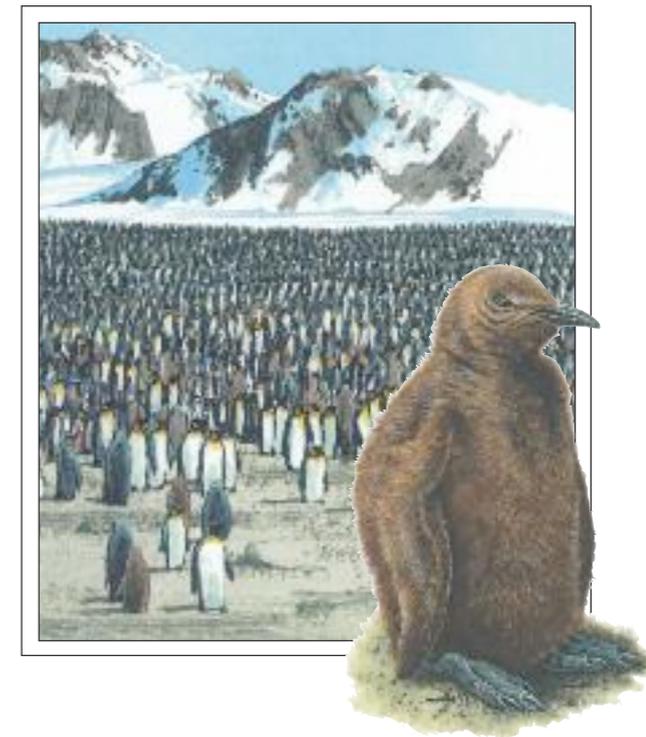


*When a female arrives, the male dances around her. They eventually mate under the canopy of his tail.*



## ANTARCTICA

**B**Y APRIL, the king penguin chicks that hatched in December have grown a covering of fluffy brown feathers and have nearly reached their adult height (*far right*). Their parents take turns to feed them, going to the sea and bringing back fish every few days. While the parents are away hunting, chicks huddle together to keep warm (*right*). This also helps to protect them from predators, such as skuas and giant petrels.



# THINGS TO DO

**A** bean is a type of seed that grows inside a long pod on a plant.

By planting a bean, you can see how seeds germinate (start growing).

For this activity you will need a glass jar, a piece of blotting paper or kitchen towel, some soil or newspaper and a bean. Runner beans or broad beans are ideal.



1 Line a jar with damp blotting paper or kitchen towel. Then fill the jar with newspaper or soil to keep the blotting paper in place.

2 Push one or two beans between the paper and the jar.



Put the jar in a warm, dark place until shoots and roots start to grow. The roots grow downwards and divide into rootlets.

Green shoots grow up towards the light.

4 After about 10 days, the bean will have grown a stem and leaves. Until it grows leaves to make food for itself from photosynthesis, it depends on food stored in its seed.



*Some seeds are spread by animals that eat a fruit and spread its seeds in their droppings. But you, too, might be spreading seeds when you walk about.*

1 After a walk in the countryside, take off your boots and scrape mud from their soles into a plant pot.

2 Water the pot and leave for a week or two.

3. Look to see if any plants have grown. Do you recognise any from your country walk?



## NATUREWATCH



Trees in leaf 10



Ants 20



Ducklings 30



Tadpoles 40



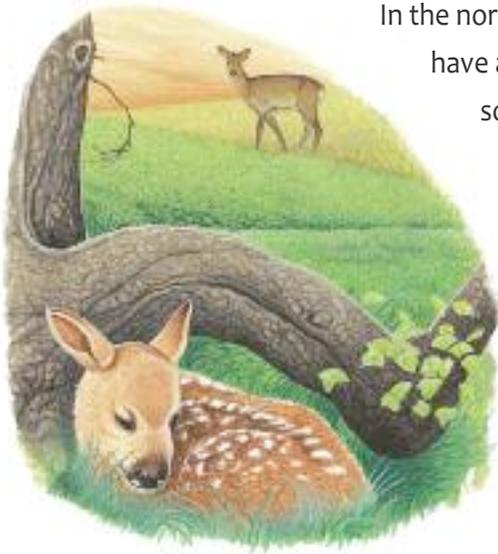
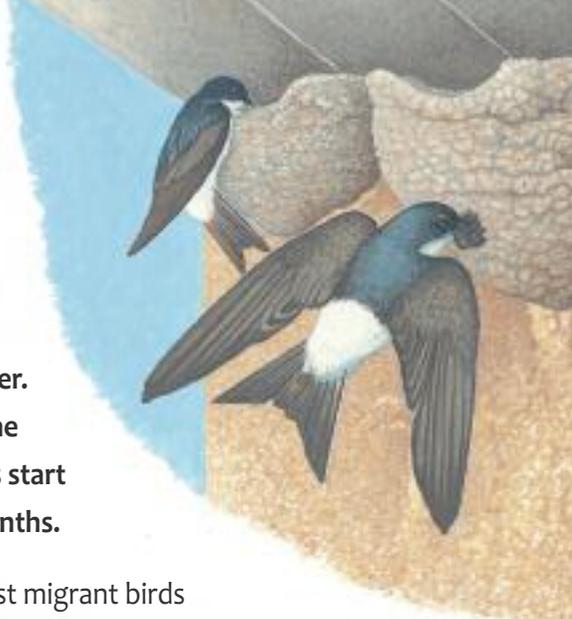
Birds on nests 50

How many of these things you can spot? Award yourself the points on the right!

# THE WORLD

## IN MAY

**I**N THE NORTHERN hemisphere, spring moves into summer. Most animals are breeding or raising young by now. In the southern hemisphere, winter has nearly arrived. Animals start to leave for warmer lands or else prepare for the winter months.



In the northern hemisphere, most migrant birds have arrived from their wintering grounds in the south. Martins have returned to Europe from Africa and are busy building their nests out of mud and saliva. The nests are built on the overhang of cliffs or the eaves of buildings (*above*).

In a thicket of long grass a fawn hides while its mother is feeding. Roe deer are born with spotty fur, to camouflage them in the dappled light of the forest floor. Until they are strong enough to run from danger, fawns are safest hidden from sight.

In the southern hemisphere, the nights are growing longer and temperatures are starting to drop. Autumn is the main mating season for impala antelope. Males aim to establish a territory that will attract females, where the young can be reared safely. Most territories can only be won by defeating its owner in battle.

*Male impalas lock horns and try to throw their opponents off balance.*



## ARCTIC

**I**N MAY, huge flocks of Arctic terns arrive in the Arctic, after a journey of nearly 35,000 kilometres from Antarctica. Here, they gather in huge colonies to mate and breed. Their chicks would make an easy meal for a fox or gull, so the colony guards them fiercely. If an intruder approaches, the birds assemble in an angry mob, squawking loudly and diving at the intruder's head (right).

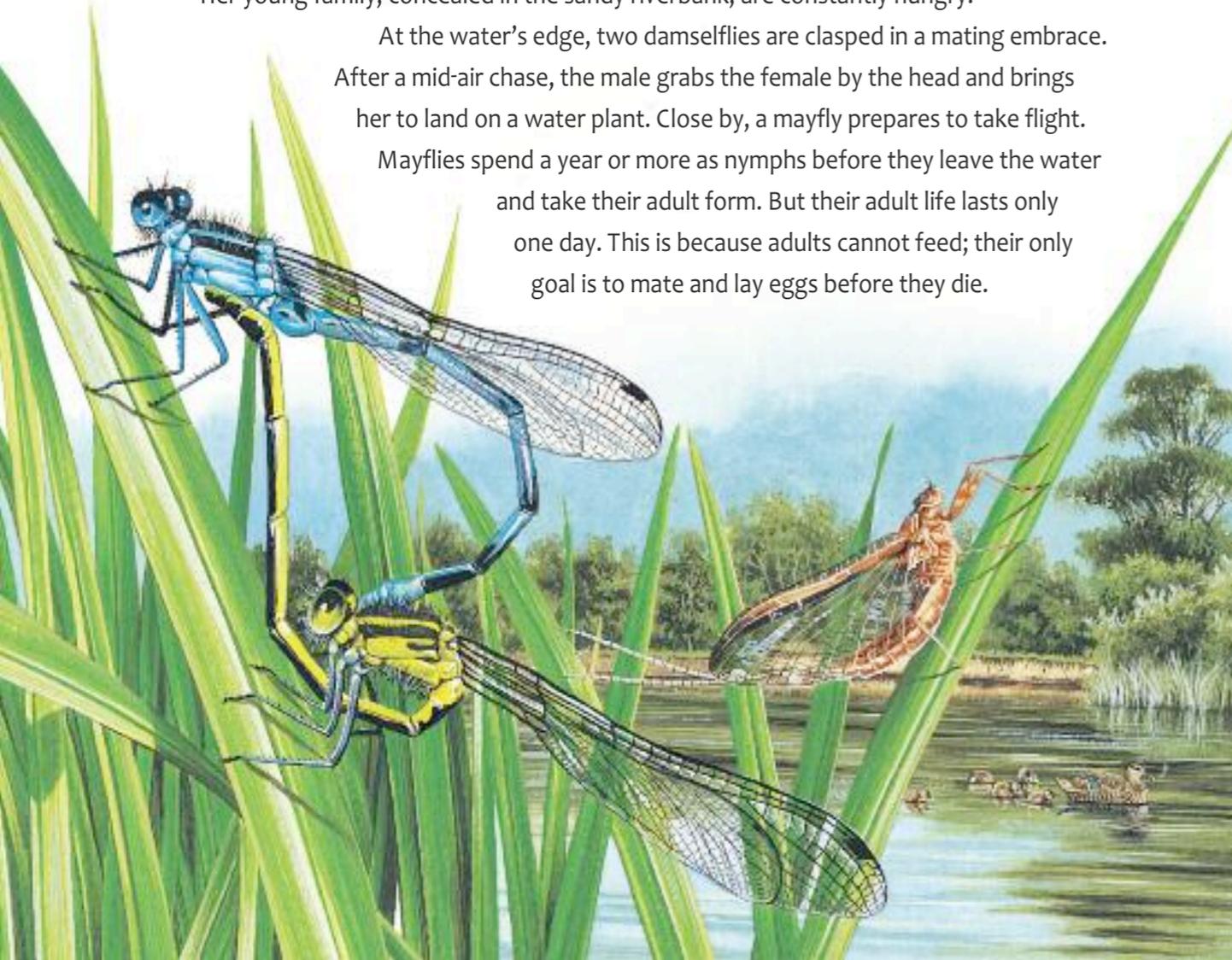


## EUROPE

**O**N THE BANKS of a European river, May brings a flurry of activity. A family of mallard ducklings follow their mother across the water, while a kingfisher dives for fish. Her young family, concealed in the sandy riverbank, are constantly hungry.

At the water's edge, two damselflies are clasped in a mating embrace. After a mid-air chase, the male grabs the female by the head and brings her to land on a water plant. Close by, a mayfly prepares to take flight.

Mayflies spend a year or more as nymphs before they leave the water and take their adult form. But their adult life lasts only one day. This is because adults cannot feed; their only goal is to mate and lay eggs before they die.



## NORTH AMERICA

**O**N THE GREAT LAKES, huge colonies of western grebes gather to breed. Before they mate, the grebes take part in elaborate courtship dances (right). Then couples set about building their nests. Grebes build floating nests, anchored by weeds in the lake floor. They make them close together, forming a large raft where the eggs are safe from land predators.



In southern Canada, warmer weather signals the start of the breeding season for red-sided garter snakes (above left). The snakes have spent winter in rock crevices, sheltering from frosts, but now they start to emerge. As each female comes out, she is quickly surrounded by males, all competing to mate with her.

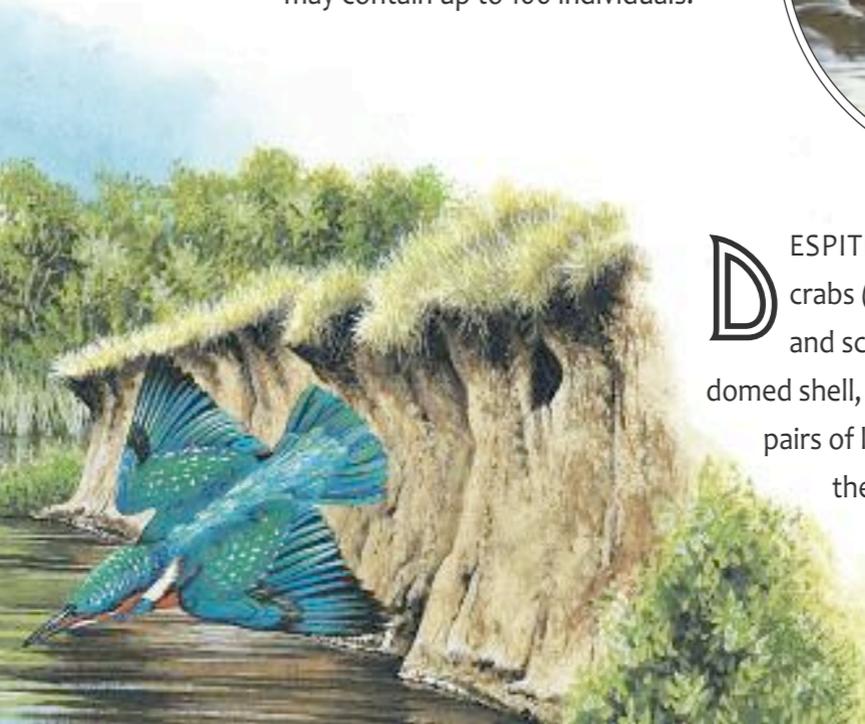
"Mating balls" of males around one female may contain up to 100 individuals.



*During courtship, grebes appear to trot across the water side by side, with their wings held back and their elegant necks curved upwards.*



**D**ESPITE THEIR NAME, horseshoe crabs (above) are relatives of spiders and scorpions. They have a hard, domed shell, a long pointed tail and six pairs of legs. At high tides in spring, they climb up beaches across North America to mate and lay their eggs.



## SOUTHERN AFRICA

**A**MID THE SAVANNAH plains of southern Africa lie the swamplands of the Okavango Delta. The annual flooding, starting in May, draws a huge variety of animals to the region. Buffalo, zebras and elephants flock to the area, but other animals live here all year round. Sitatunga antelope live on the edge of the swamps, ducking under the water completely to hide from predators. Hippos spend their days in the water, coming out at night to feed on grass.



## CENTRAL AMERICA



**I**N THE RAINFORESTS of western Costa Rica, heavy rains have drawn out a crowd of golden toads. Bright orange males gather round rainwater pools, waiting for females who come to the pools to spawn. Males grab on to passing females and are carried to the pools. As the female releases her eggs into the water, the male fertilizes them.

*Two males watch a female in a pool after spawning.*

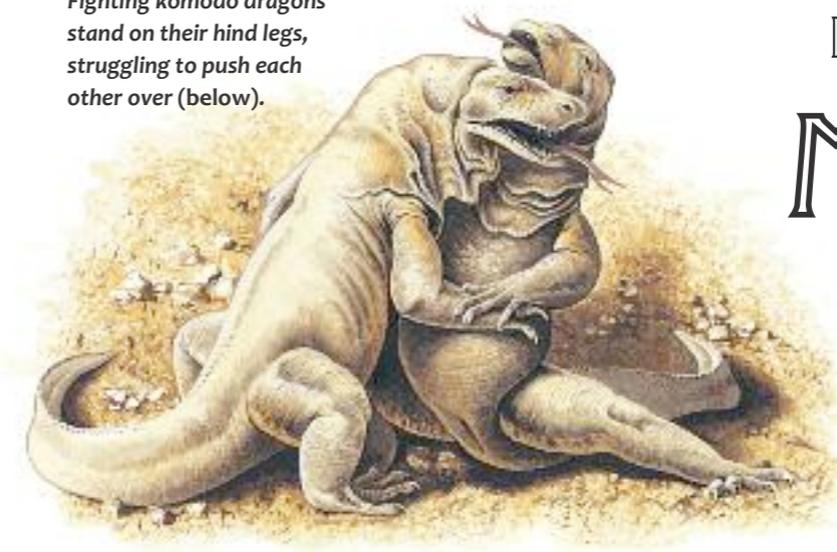
## SOUTH ATLANTIC

**A**LONG THE BEACHES of Ascension Island, green turtles are hatching. They scrape away the sand over their nests then hurry towards the sea. Many are eaten by predators on the short journey to the surf. When they finally near the sea, the surviving turtles wait for a wave to carry them away. In the water they are safer. They can dodge the beaks of diving birds, but they must still avoid sharks. The young turtles search for rafts of floating seaweed. On them they can drift safely until they are big enough to swim in the open ocean.



*Before they reach the sea, many hatchlings are picked off by gulls and crabs.*

*Fighting komodo dragons stand on their hind legs, struggling to push each other over (below).*



## INDONESIA

**M**AY IS THE START of the Komodo dragon's mating season. Males compete with each other over females and often fight to display their strength and dominance. Fights sometimes result in severe injury or even death.

# THINGS TO DO

**T**ry this activity to get a closer look at mini-beasts where you live.

1 Wearing gardening gloves, scoop up some fallen leaves from the ground. The longer they have been there, the more mini-beasts will have made their home in them.

2 Place a plastic funnel in the mouth of a glass jar. If you do not have a funnel, you can easily make one by rolling up a piece of card or paper.

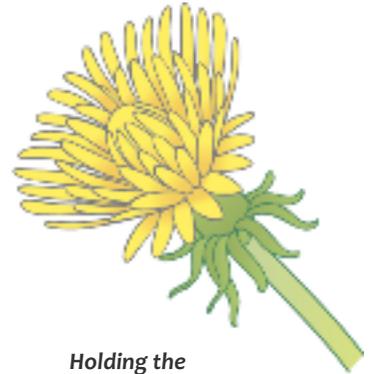
3 Fill the funnel with the leaves and place it beneath a lamp—not too close or your mini-beasts will overheat. Leave the funnel there for an hour or two.

4 The mini-beasts will avoid the heat and light of the lamp by wriggling down and dropping into the jar.

5 Now you can have a good look at the mini-beasts. When you finish, make sure you put the mini-beasts back where you found them.



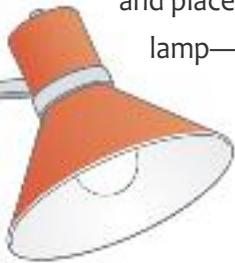
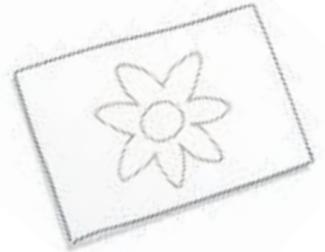
*Pick a fresh looking dandelion with a bright yellow flower head—that is, before it goes to seed and turns grey and fluffy.*



*Holding the dandelion like a pen, use the sap from its stalk to write a message or draw a picture on a piece of white paper.*



*You won't be able to see anything straight away. Leave the paper to dry and your message will gradually become visible!*



## NATUREWATCH

	Bluebells	10
	A fern uncurling	20
	A ladybird flying	30
	Broken eggshells	40
	A dragonfly	50

How many of these things you can spot? Award yourself the points on the right!

# THE WORLD

## IN JUNE



**I**N THE NORTHERN hemisphere, it is the height of summer. Plants flourish and there is a flurry of activity as the longest day of the year approaches. In the south, winter has arrived. Some animals migrate to warmer regions, while others prepare to endure the hardest months.

In June, the northern hemisphere is tilted towards the Sun, so the Arctic lands remain bathed in sunlight for 24 hours a day. On the other side of the world, Antarctica is permanently dark.

It is now at its coldest time of the year, with ice covering the surrounding seas. Some animals, such as the humpback whale, leave for warmer waters further north. Only a few animals stay.

*In Europe, a bumblebee settles on a dog rose to gather nectar, while a pair of butterflies mate on a leaf.*



In Australia, animals born in the summer are quickly growing up. In the branches of a eucalyptus tree, a koala rests with her baby on her back (*left*). When it was born, the baby, called a joey, was just the size of a bean. But after six months suckling inside its mother's pouch, it is now too big to stay there any longer.

In the North Atlantic, seabirds gather in huge cliff-side colonies. When their chicks hatch, parents catch fish to bring them. A puffin may carry about 10 fish in its beak at a time. Birds that feed further out to sea, such as guillemots, swallow their catch and regurgitate it back at the nest.

*Seaside cliffs are ideal nesting sites as they are out of reach of most predators but are a perfect landing point for fishing*



## ARCTIC



**S**UMMER HAS FINALLY arrived in the tundra, the frozen treeless lands bordering the Arctic Ocean. The ground thaws briefly and plants, such as grasses, herbs and lichens, start to grow. Reindeer gather on the tundra each summer to graze and give birth. Females give birth to one, or occasionally two, calves.

*Reindeer calves can walk almost as soon as they are born.*

On a high cliff nearby, five barnacle geese have just hatched out. In just a few hours, they will leap from the cliff on to the grassy plain below, to feed on plants exposed beneath the snow. If they do not make the leap, they cannot eat, but the drop is dangerous too. Many goslings are hurt on the rocks, and others fall prey to predators.



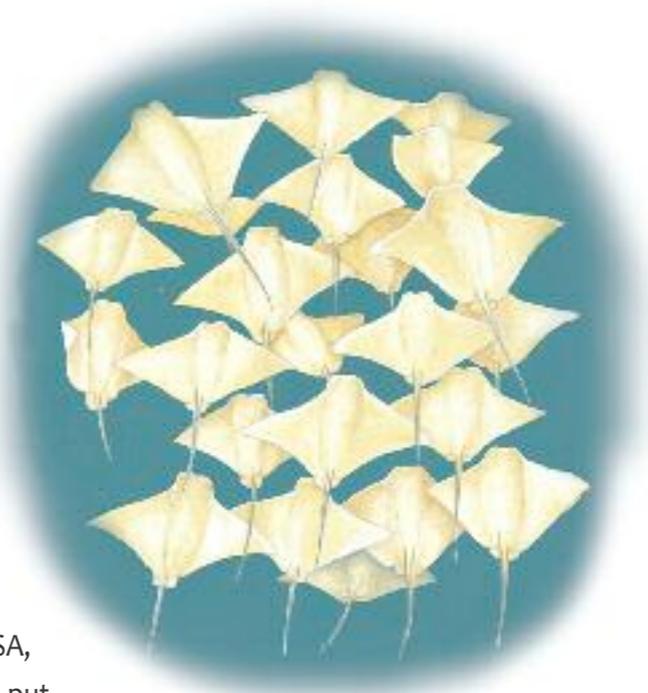
*The walrus (below) take to the sea from time to time to dig up clams from the seabed.*

**O**FF THE COAST OF ALASKA, a group of male walrus bask in the sun (below). They gather here each summer, while the females raise their pups on ice floes out to sea. The walrus are grey when they leave the cold sea, but, after half an hour lying in the sun, their skin turns almost pink. This is because blood rushes to their skin to help carry the heat away from their bodies.



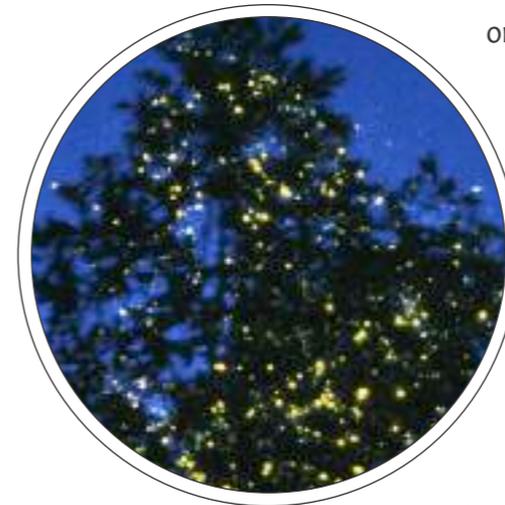
## NORTH AMERICA

**E**VERY YEAR, thousands of golden rays gather in the seas off the coast of Mexico. From here these schools of fish head towards the waters off western Florida. Golden rays, also known as cownose rays, because of their domed heads, measure up to two metres across. With their large “wings”, they are able to cover long distances easily. Swimming in groups, their flapping action stirs up sand on the seabed, exposing clams and oysters for the rays to eat.



Meanwhile, in the mountains of Tennessee, USA, hundreds of fireflies put

on a spectacular show, flashing together in unison (below). Males flash together, then females flash in response. These light displays are part of the fireflies’ mating ritual.



## EUROPE

**B**Y EARLY SUMMER, a honeybee colony is getting crowded. As the

*A queen bee and her workers start a new colony (below). They cluster on a branch while scouts look for a suitable site.*

colony grows, workers start

to feed the young nothing but royal jelly, a rich substance secreted by the bees. These young will grow into new queens.

Soon, the old queen will leave the hive to start a new colony. She is followed by a train of workers who protect her and help build the new hive. In the old colony, new queens mature and leave the nest. One of them will return to the hive to lay her eggs. Others start their own colonies elsewhere.



# SOUTHERN AFRICA

**E**VERY YEAR, HUNDREDS of shoals of sardines gather along the south coast of Africa. This event, known as the

“Sardine Run”, occurs each winter when a current of cold water pushes the fish up the east coast of Africa into the Indian Ocean. The sardines attract thousands of predators, including dolphins, sharks, seals, cormorants, gannets and humpback whales.

*Dolphins herd the fish together to feed on them*



# EAST AFRICA

**O**N THE SERENGETI PLAIN in East Africa, it is winter and the start of the four-month-long dry season. The wildebeest and zebras that roamed these

plains in autumn have moved on in search of better grazing. Without these animals, the lions face months with little food.

Vultures have keen eyesight and a sharp sense of smell to help them find carcasses. Spotting a vulture flying in low circles, a lioness goes to investigate. She finds the body of a zebra that has died from thirst. The lions will not go hungry today.

*A hyena lurks near the zebra carcass (below), hungry, but afraid of the lions. The vulture flies off. It will return once the lions have left and feed on the rich marrow inside the zebra's bones.*



# INDONESIA

**J**UNE IS THE height of the Komodo dragon mating season. The lizards (*below*) are usually solitary, but males

and females sometimes meet when feeding. A male will follow a female for days, rubbing his chin against her and licking her back until she lets him mate with her.



*Male emperor penguins keep their egg warm is under a special pouch of skin, called a brood pouch (below).*

# ANTARCTICA

**D**ESPITE FREEZING WINTER weather, June is the peak of the emperor penguins' breeding season.

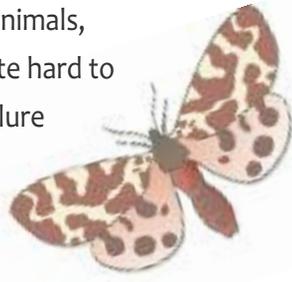
After mating in May, each female lays a single egg, which she passes to the male to care for. Once the egg is handed over, the female returns to the sea to feed over the winter.

The male balances the egg on top of his feet to keep it off the ice. Males huddle together for warmth, taking turns to stand in the warmest spot at the centre of the group. The chicks will hatch in August, in time for their mothers' return.



# THINGS TO DO

**L**ike all nocturnal animals, moths can be quite hard to find. But you can lure them into your garden with a sugary mixture or a bright light.

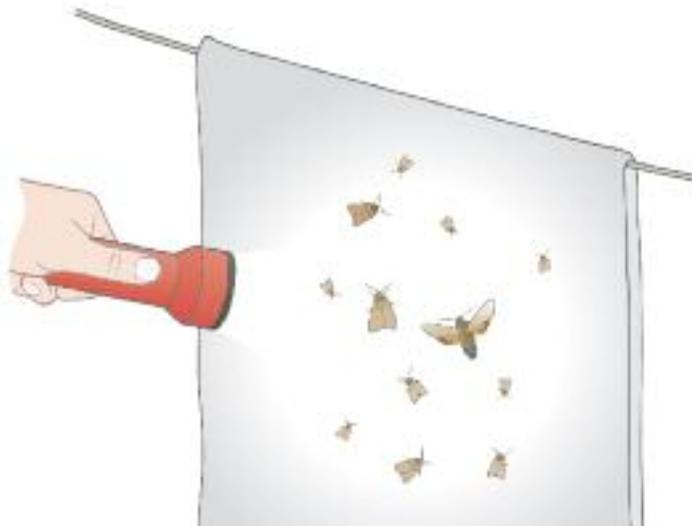


1 Stir together some golden syrup with a little hot water and a few extra spoonfuls of sugar. You can also mash a bowl of slightly rotten fruit with a little water.

2 Paint the mixture on to a tree trunk, fence post or a piece of rope hanging from a branch. Check the area after dark. How many different types of moth are there? Are there any other nocturnal insects?



3 You can also use bright lights to attract moths. When it gets dark, shine a torch at a white sheet, hung up outside.



1 Pick a flower or leaf from your garden or find one that has naturally fallen. Never pick wild flowers.



2. Place it between several sheets of blotting paper or kitchen towel.

3 Place the flower and paper between two books and leave for at least 3 days.

4 Open the paper to reveal your pressed flowers and leaves. Stick them into a notebook or use them to make a greetings card.



## NATUREWATCH

	Butterflies	10
	Swifts and swallows	20
	Dog rose	30
	Bees on flowers	40
	Bats flying at dusk	50

See how many of these things you can spot. Award yourself the points on the right!

# THE WORLD

## IN JULY

**I**N THE NORTHERN hemisphere, July is often the hottest month of the year. Many plants are still in flower, but some fruits and berries are also starting to grow. At the same time, the southern hemisphere is in the depths of winter.

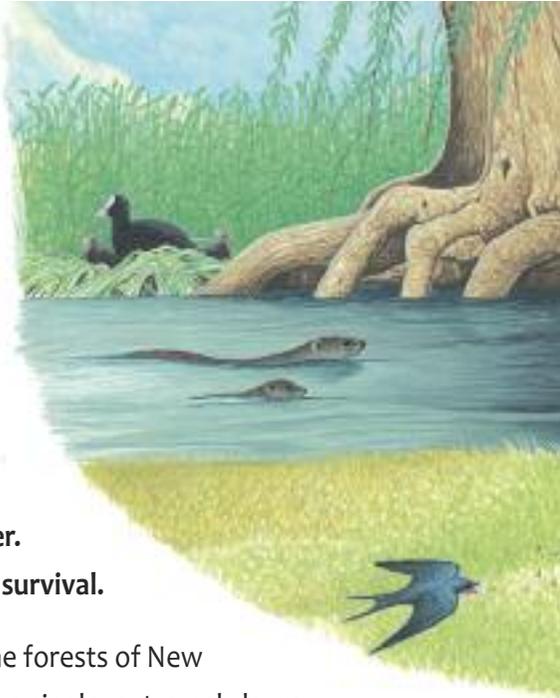
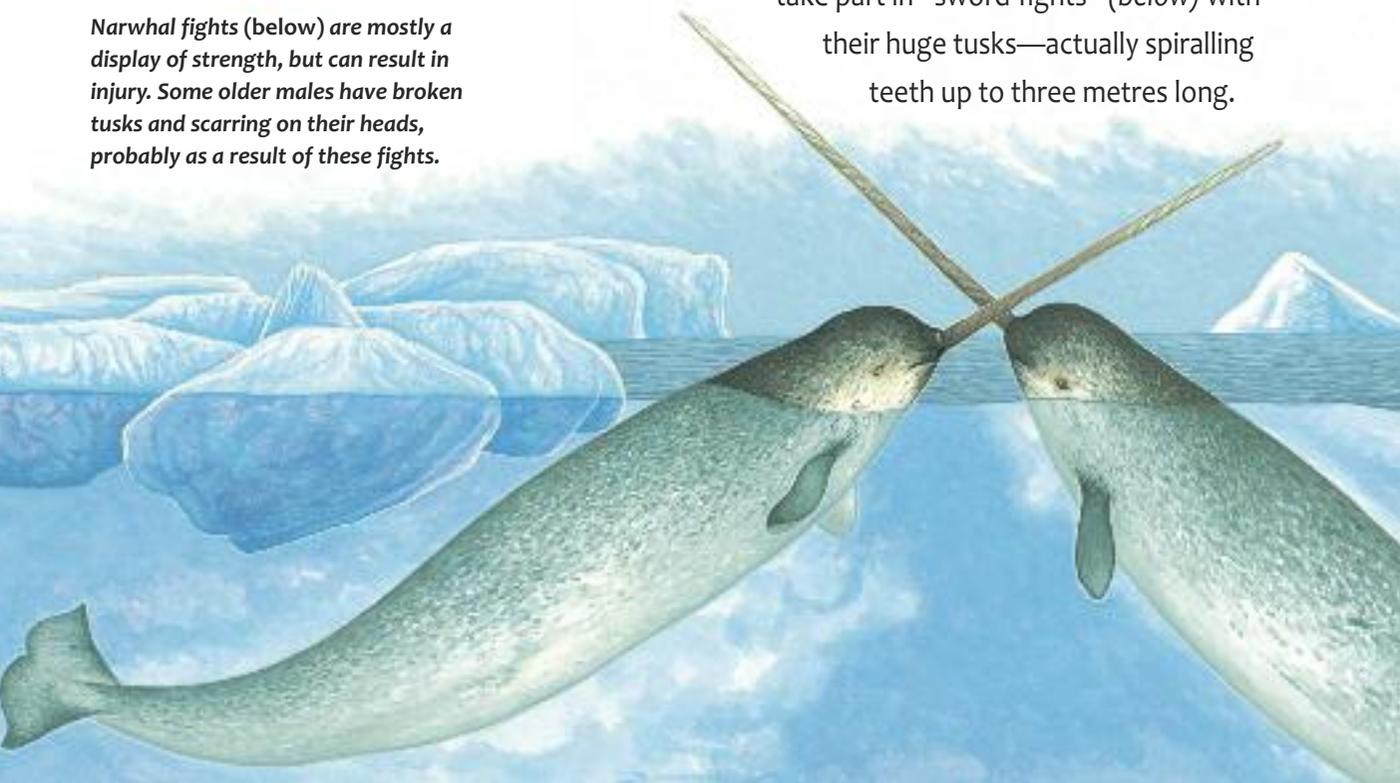
**In Antarctica, each day is a struggle for survival.**



*Narwhal fights (below) are mostly a display of strength, but can result in injury. Some older males have broken tusks and scarring on their heads, probably as a result of these fights.*

Nestled in its burrow, deep in the forests of New Zealand, a male kiwi incubates a single, extremely large, white egg (*left*). It was laid about a week ago by his partner. He will sit on the egg for up to three months until it hatches. Young kiwis may take up to three days to break out of their tough-shelled eggs. They then stay with their parents for three weeks.

By July, thousands of narwhals have gathered in northern Arctic waters, ready for the start of their breeding season. Some males take part in “sword-fights” (*below*) with their huge tusks—actually spiralling teeth up to three metres long.





## ARCTIC

**M**any polar bears spend the summer on the shores of Alaska. Away from the ice, they cannot hunt seals, so they feed on berries, seaweed and whatever meat they can scavenge. When the carcass of a grey whale washes ashore its attracts a crowd of bears, led to the site by their excellent sense of smell. There is plenty of food to go around but the hungry males can quickly turn aggressive. To avoid confrontation, newcomers must approach slowly in wide circles.

## EUROPE

**B**Y MIDSUMMER, badger cubs have begun to play less and eat more. The cubs' mother no longer needs to be so attentive, as the young badgers are becoming more and more able to fend for themselves. As dusk falls, the badger family leave their sett to go in search of food (right). They spend the night foraging for insects, worms and small animals, such as mice



and birds. Earthworms make up the largest part of the badgers' diet.

Last summer an adult dragonfly lay her eggs just under the water, on the stalks of a lily. The young dragonflies that hatched out are called nymphs. Over the year, they stayed underwater, hunting insects, tadpoles and small fish.

Now, on a warm day, a nymph climbs out of the water and rests on the stem of a plant. It then hauls itself out of its old skin and emerges as a fully-grown dragonfly (left).

It takes an hour or so for the dragonfly to gain strength and for its crumpled new wings to flatten out and harden. It flies away as soon as it can.



## MIDDLE EAST

**A**S NIGHT CLOSES IN, a jerboa (right) bounds across the desert sand, searching for insects and seeds to eat. During this, the hottest month of the year, it spends most of its time in an underground burrow, venturing out only at night. It even plugs the burrow's entrance with sand each day to keep out the heat.

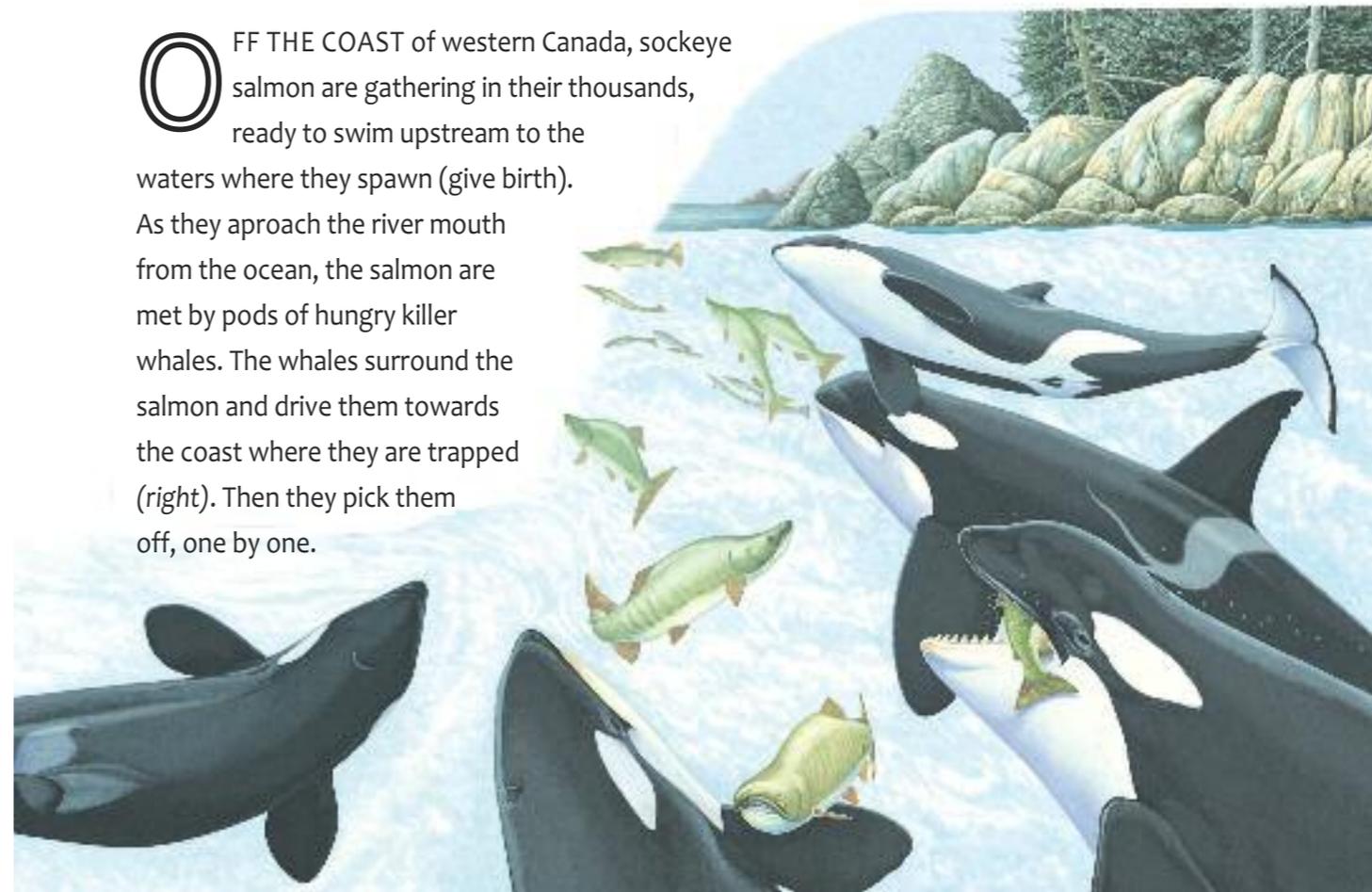


Thousands of ladybirds cluster in cool areas (above).

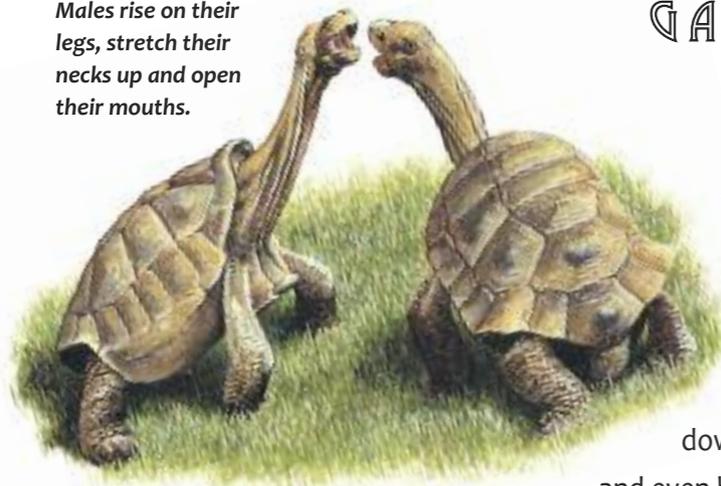
## NORTH AMERICA

**I**N JULY, ladybird larvae, hatched in the spring, change into adults. But in the American Southwest, they make this change at just the time when their main food, aphids, are dwindling in the summer heat. So the ladybirds leave the hot lowlands and fly to cooler hills nearby. Here they cluster together to sleep through the hottest months (left).

**O**FF THE COAST of western Canada, sockeye salmon are gathering in their thousands, ready to swim upstream to the waters where they spawn (give birth). As they approach the river mouth from the ocean, the salmon are met by pods of hungry killer whales. The whales surround the salmon and drive them towards the coast where they are trapped (right). Then they pick them off, one by one.



Males rise on their legs, stretch their necks up and open their mouths.



## GALAPAGOS ISLANDS

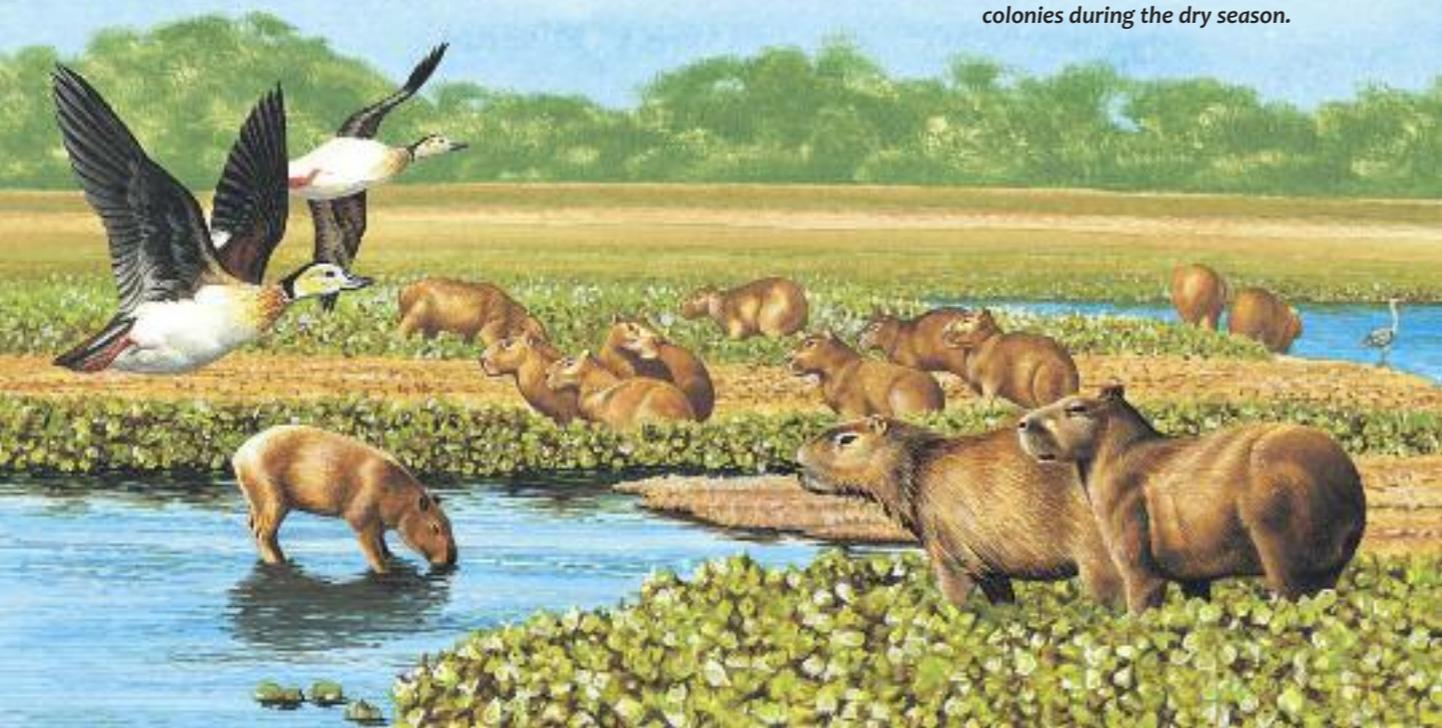
**E**VERY BREEDING SEASON, male giant tortoises battle for supremacy (left). When two males meet, they face each other and stretch their necks up as high as they can reach. The tortoise who stretches highest wins, while the other retreats. If neither tortoise backs down, the males may resort to bumping heads and even biting each other.

## SOUTH AMERICA

**T**HE PANTANAL, deep in the heart of South America, is the largest wetland in the world. But during the dry winter, it is no more than a string of shallow pools. Fish, trapped in tiny pockets of water, are easily picked off by storks and herons. Capybaras (below) gather at the water's edge to feed on grasses and water plants. At the first sight of predators—for example, jaguars, caimans and snakes—they dive into the water and swim away to safety.



Birds such as herons, egrets and spoonbills (above) nest in huge colonies during the dry season.



## NEW GUINEA

**O**N THE COAST OF a small island, a coconut crab is scaling a tall palm tree in search of food (right). It is huge: its legs span more than a metre. Coconut crabs usually live in burrows, coming out only at night to forage for fruit or nuts. But in the breeding season, the crabs venture out for longer periods while they search for a mate. After mating, the female lays her fertilized eggs in the sea. When they hatch, the young crabs will spend the first part of their lives in the sea.

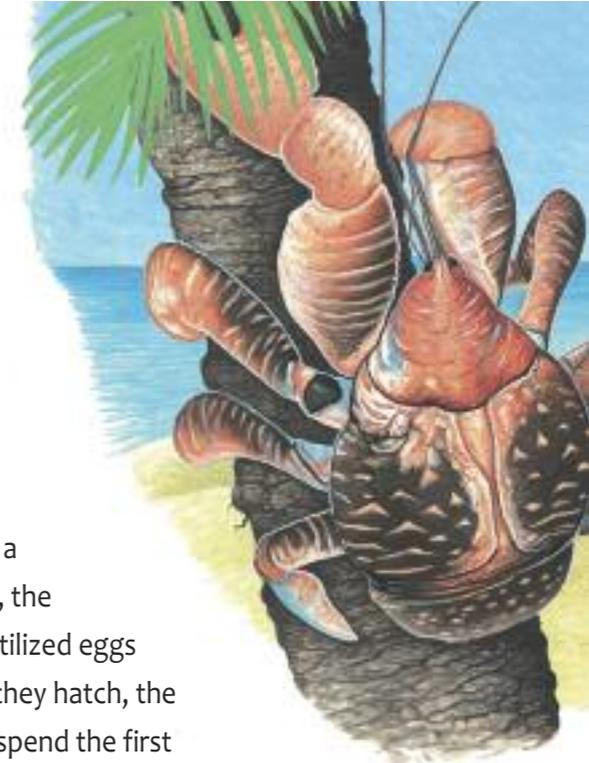


Meanwhile, a male bird of paradise climbs into the branches of a tree perform his courtship display (above, left). He throws his tail feathers over his head and shakes them vigorously. Colourful plumage makes the male bird of paradise highly attractive to females of the species. Bright colours signal to females that a male is healthy and will produce strong young.

## ANTARCTICA

**A**DELIE PENGUINS spend the Antarctic winter on the edge of the pack ice, diving for fish and krill. Like all penguins, the Adélies are fast and graceful swimmers, gliding smoothly through the water. As they swim, they must look out for leopard seals that patrol these seas. Adélie penguins are so fearful of leopard seals that they hesitate at the water's edge, none daring to be the first to take the plunge. Leopard seals lurk in waters near the penguins' fishing grounds and mostly catch their prey by stealth. But in open water, a lucky penguin may be able to out-swim the predator.

An Adélie penguin puts on a sudden burst of speed to escape the jaws of a leopard seal (below).

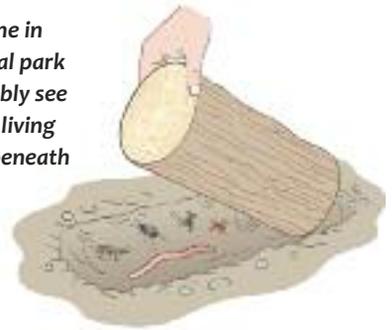


# THINGS TO DO

**M**aking an underwater viewer will enable you to look at the plants and creatures that live in water. Ask an adult to scoop some water from a pond or river and look at this. Be careful exploring near water. If you go to the coast, remember the tides can come in very quickly.



*Lift up a log or stone in your garden or local park and you will probably see lots of mini-beasts living in the dark space beneath it. To see which mini-beasts live near you, make a "mini-beast home".*

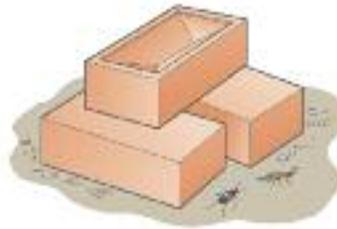


**1** Find a shady spot outside, for example, beside a fence or wall, but not too close to your kitchen.

**2** Stack some bricks in a pile or put out a broken pot. Look inside every day for mini-beasts.



**1** Using scissors, cut both ends off a plastic bottle. Take care of the plastic's sharp edges.



**2** Stretch a clear plastic bag or a sheet of cling film across one end of the bottle. Secure it with an elastic band or some tape.



**3** The plastic at the open end of your viewer may be sharp. Cover it with some thick tape.

**4** Push the covered end of the viewer beneath the water and look through the open end. What can you see?



## NATUREWATCH



Stinging nettles **10**



Wild honeysuckle **20**



A caterpillar **30**



Feathers (from birds moulting) **40**



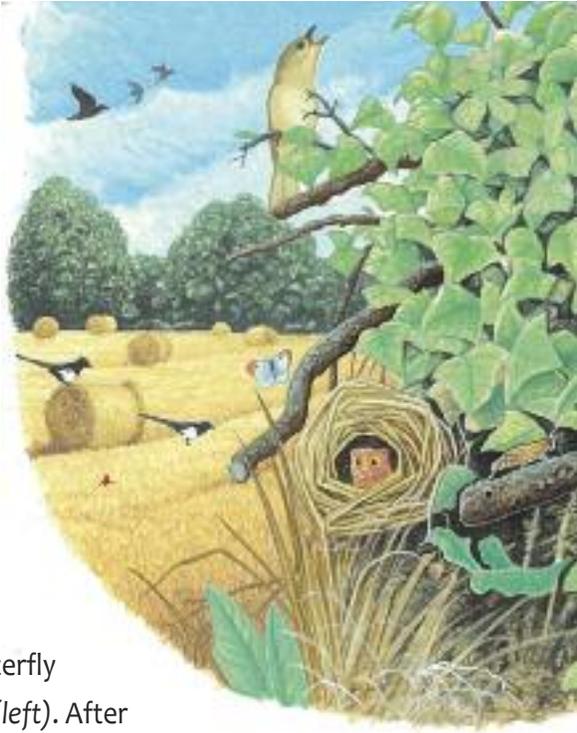
Flying ants **50**

See how many of these things you can spot. Award yourself the points on the right!

# THE WORLD

## IN AUGUST

**I**N THE NORTHERN hemisphere it is still high summer, although there are signs, particularly in northern regions, that autumn is on the way. Meanwhile, winter draws to a close in the south. Many animals mate so that their young will be born in time for the summer months.



*A harvest mouse peeks out of her grass nest (above). She is about to give birth to her third litter of young this summer.*



In North America, a monarch butterfly caterpillar has just hatched out (left). After hatching, the caterpillar starts to munch on the milkweed plant its egg was laid on, devouring the stalk, leaves and flowers. It is this diet that makes it poisonous. The caterpillar's bright black and yellow stripes warn other animals that it is bad to eat. Each caterpillar moults (sheds its skin) five times before it is ready to turn into a butterfly.

In Indonesia, a female Komodo dragon looks for a place to lay her eggs (below). She digs a burrow deep into the side of a sandy slope, or takes over one abandoned by another animal. Crawling into the burrow, she lays between 12 and 30 soft-shelled eggs. The eggs are laid one or two metres from the surface so that they do not get too hot in the sun. Conditions must be perfect for the eggs to hatch. The mother guards her nest for a month or two. This is mainly to prevent another nesting mother from digging up the eggs.

*A komodo dragon stands guard at the entrance to her nest burrow.*





*Beluga whales rub against the gravelly river bed to scrape away a layer of dead, yellowed skin, revealing a new layer beneath it (above).*

## ARCTIC

**B**Y AUGUST THE Arctic sea ice has completely broken up. With their way cleared of ice, hundreds of beluga whales migrate north to the river inlets of Canada's Arctic islands. This is where belugas come to moult each year. They are the only species of whale or dolphin known to undergo a seasonal moult. As well as moulting, females give birth to their young.

## EUROPE

**T**OWARDS THE END OF the summer, the queen bumblebee lays several eggs in unusually large egg cells. The young from these eggs are given extra food so that they will grow into new queens. She also lays a batch of unfertilized eggs, which develop into male bees. After the males and the queens have mated, the males die. The new queens look for burrows where they will hibernate for the winter.



*A pair of worker bees push pollen into egg cells (above). The large larva will develop into a queen.*

## NORTH ASIA

**A**FTER A LONG DRY SPELL, the rains come to India, starting in a period of wet weather called the monsoon season. A fishing cat surveys the river beneath it, then darts a paw into the water to grab a fish. The metre-long cat may sometimes leap into the water, even diving beneath the surface in pursuit of its prey.

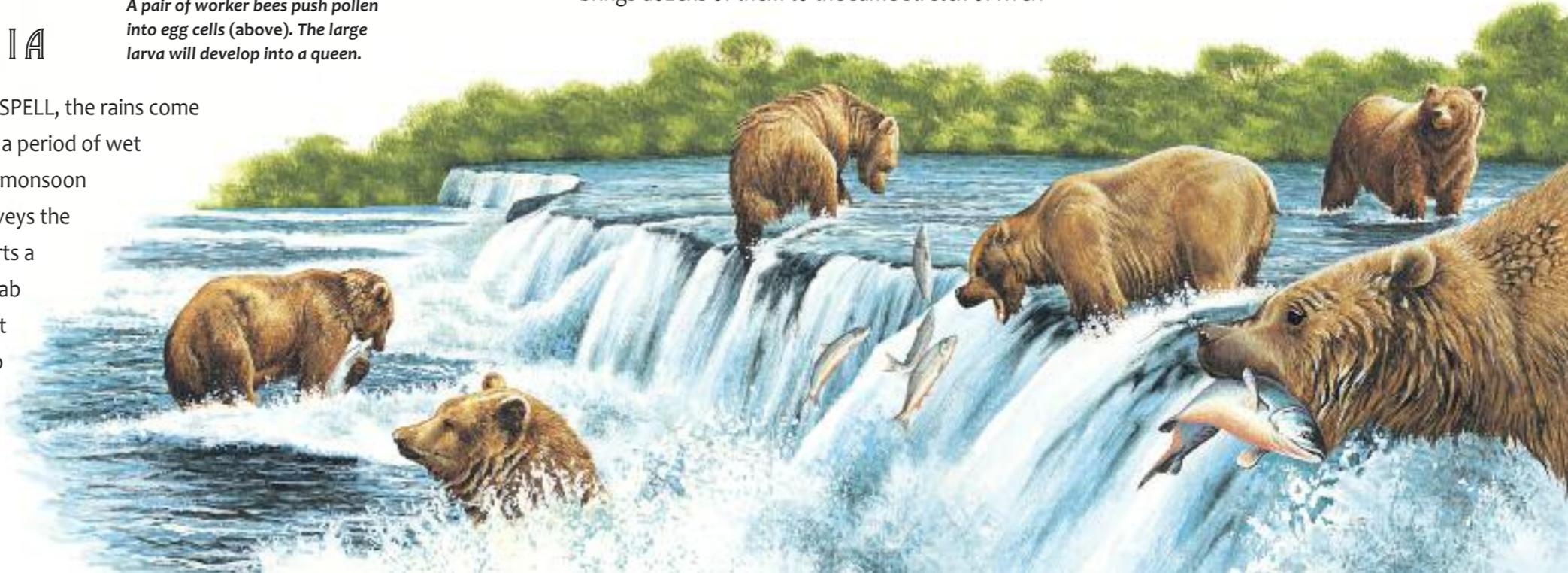


*As dusk falls in southwestern USA, hundreds of thousands of free-tailed bats fly out of caves in search of food (above). The bats arrived back in the spring to feast on the summer's insects. They eat about half their own weight each night.*

## NORTH AMERICA

**I**N LATE SUMMER, sockeye salmon are swimming upriver to the headwaters where they themselves were born. Here they will lay their eggs and die. First they face an exhausting and perilous journey, battling against strong currents, waterfalls and scores of hungry brown bears (*below*).

The fish are at their most vulnerable when they leap from the water to clear waterfalls. This is precisely where the bears gather, ready to catch one in their powerful jaws. Bears are usually solitary, territorial animals, but the promise of bountiful fish and their rich, oily eggs brings dozens of them to the same stretch of river.



## SOUTHERN AFRICA

**I**N MUCH OF SOUTHERN Africa, it is the middle of the dry season. Waterholes rapidly shrink, and hippos find themselves crowded in large groups of more than 100 individuals. Bulls, used to ruling their own territory, engage in fierce battles for dominance (right). Fights usually end when one male gives in to a stronger rival, but some end in serious injury or even death. Most males bear scars from previous fights.



Fighting hippos (above) use their upper canine teeth to push rivals away, slashing out at them with their long, sharp lower canines.

Giraffes (left) also crowd together around tall acacia trees, the last food available in the dry savannah. Most plant-eaters have long since left in search of fresh pastures elsewhere. But the giraffes, with their two-metre-long necks, can reach the remaining leaves on even the very highest branches.

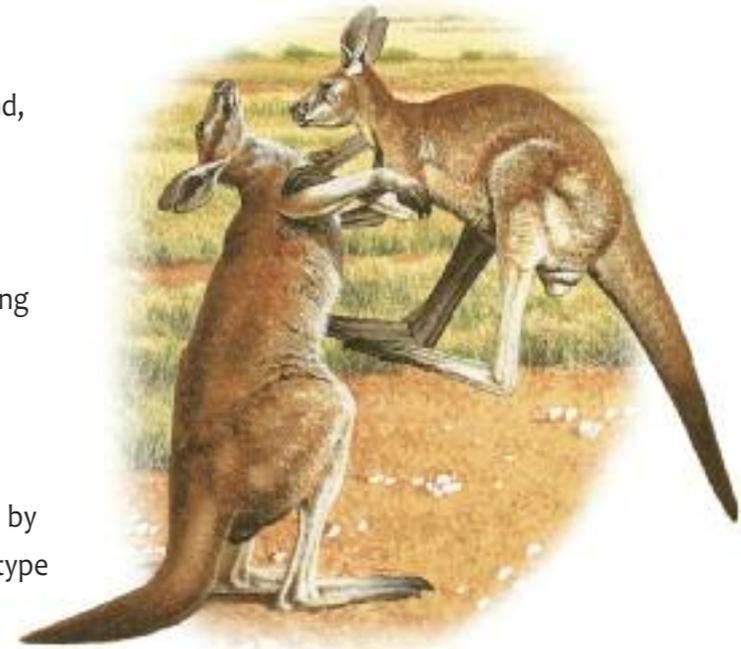


The Namaqualand is a region on the west coast of southern Africa. For most of the year it is a dry, barren landscape, but in the spring, after heavy winter rains, it bursts into flower. For a few weeks the region is transformed into a colourful carpet of wild flowers. Among them are millions of red and orange daisies, giving the region a vivid, fiery colour (right).



## AUSTRALIA

**R**ED KANGAROOS breed all year round, but the peak breeding time is in the spring. In the last months of winter, males fight one another over reproductive females, “boxing” with their fists and kicking out with their strong back feet (right).



Kangaroos use their tails for balance as they fight (above).

Spring is also the breeding season for the echidna, or spiny anteater (below). During courtship, a single female may be followed by a “train” of up to 10 males. Echidnas are a type of monotreme: mammals that lay eggs. After mating, the female lays a single egg



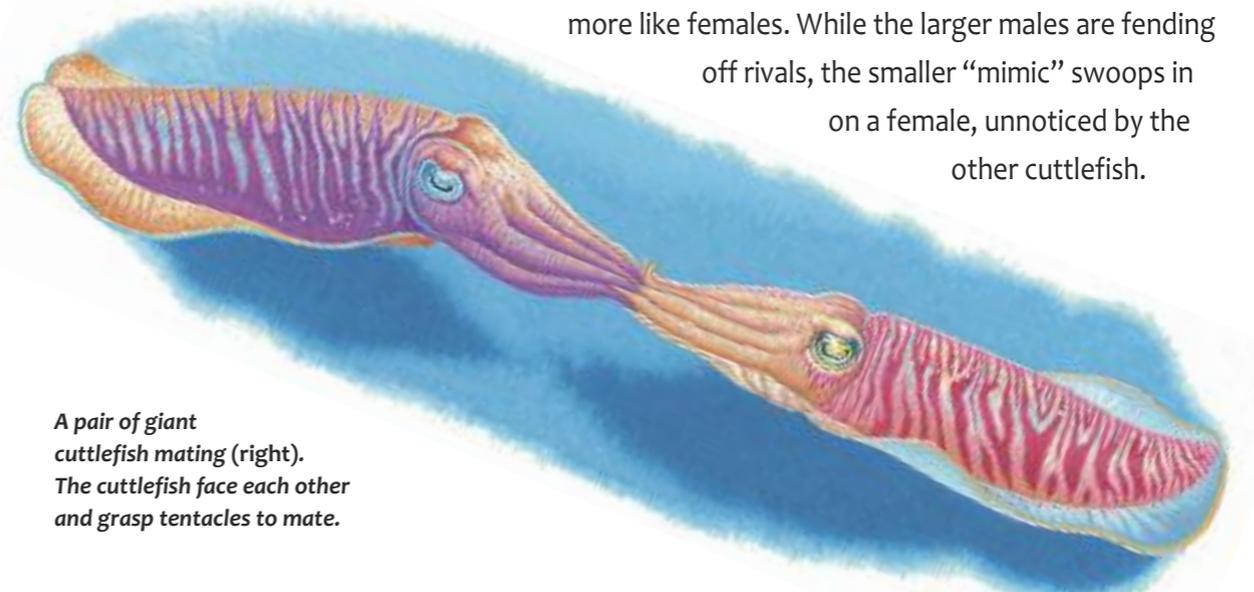
A spikey echidna laying an egg (above).

and tucks it in a pouch on her front. 10 days later, the young echidna, called a puggle, hatches.

It stays in its mother’s pouch until it is too prickly.

Meanwhile, off the coast of southern Australia, giant cuttlefish gather to mate. Larger males are more likely to gain attention, so smaller males, too small to fight for dominance, must work hard to be noticed by females. Males usually change colour to show their interest in a female, but small males may change colour to look

more like females. While the larger males are fending off rivals, the smaller “mimic” swoops in on a female, unnoticed by the other cuttlefish.



A pair of giant cuttlefish mating (right). The cuttlefish face each other and grasp tentacles to mate.

# THINGS TO DO

**M**any wild animals are startled easily and will run or fly at the first sign of humans.

The best way to watch them is by staying out of sight in a camouflaged shelter called a hide. Always check with an adult that an area is safe.



1 Make a teepee out of several branches propped together and tied at the top with some string.

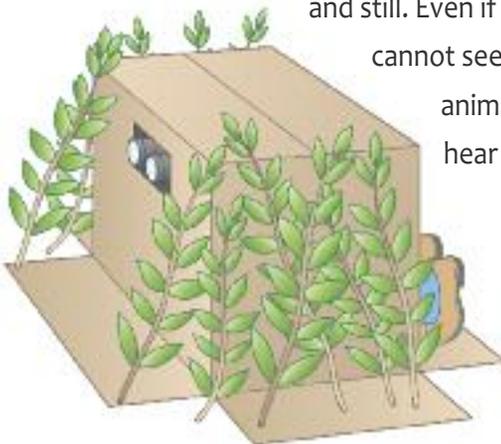


2 Camouflage the teepee with leaves and twigs. Make sure you leave a space so that you can crawl inside the hide.

3 You could also make a hide out of an old cardboard box. Prop it up so that you can climb in from one side.

On the other side, cut an opening, big enough to fit a pair of binoculars through. Prop some branches against the box to help disguise it.

5 When you are inside your hide, be very quiet and still. Even if they cannot see you, animals will hear you.



*This activity lets you see how water is sucked up through the stem of a plant.*

1 Place a celery stick in a jar of water mixed with red ink or food colouring.

2 Watch the celery over a few days. Pink areas show where the water has reached.



*Stripes running the length of the celery stem show where water travels up it.*

3 Split the stem of a white flower in two. Place one half in a glass of ordinary water and one in glass of the red water.



4 Look at the flower in a few hours. One half will be coloured by the dye.

## NATUREWATCH



Fruit on trees 10



Ripening berries 20



Wasps 30



A bird of prey circling 40



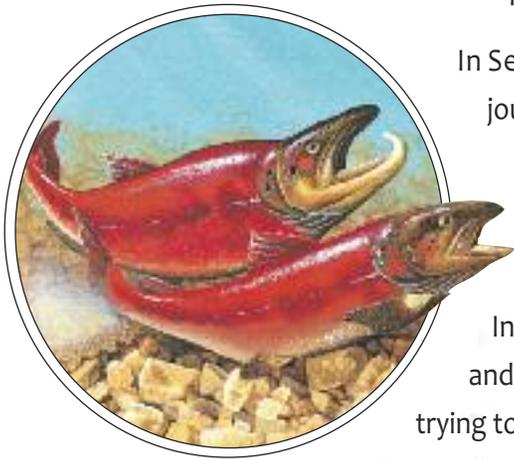
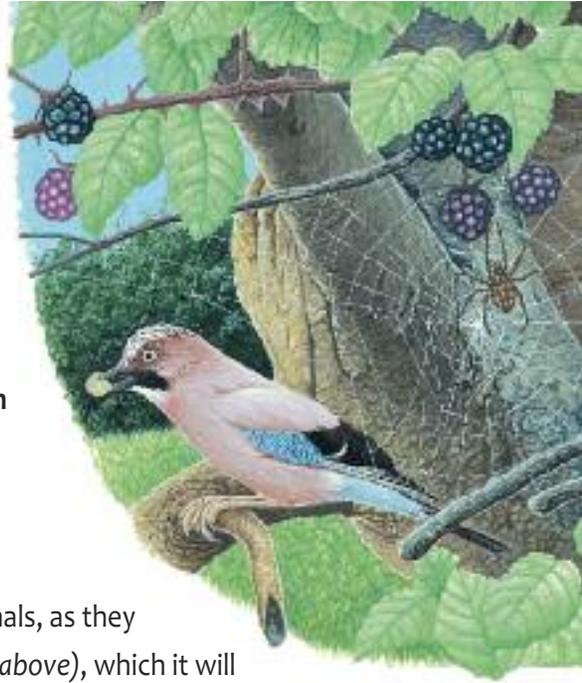
An empty bird's nest 50

How many of these things you can spot? Award yourself the points on the right!

# THE

**A**S SUMMER DRAWS to a close, animals in the northern hemisphere prepare for the winter by eating as much as possible. In the southern hemisphere, the start of spring sees many animals mating or giving birth.

A bounty of fruit in Europe provides a feast for resident animals, as they seek to put on weight before the winter. A jay gathers nuts (*above*), which it will hide in the ground and retrieve in winter, when food is in short supply. Meanwhile, blackberries ripen on thorny branches and a spider spins its web to catch the last of the year's flying insects. September is also the start of the spiders' mating season.

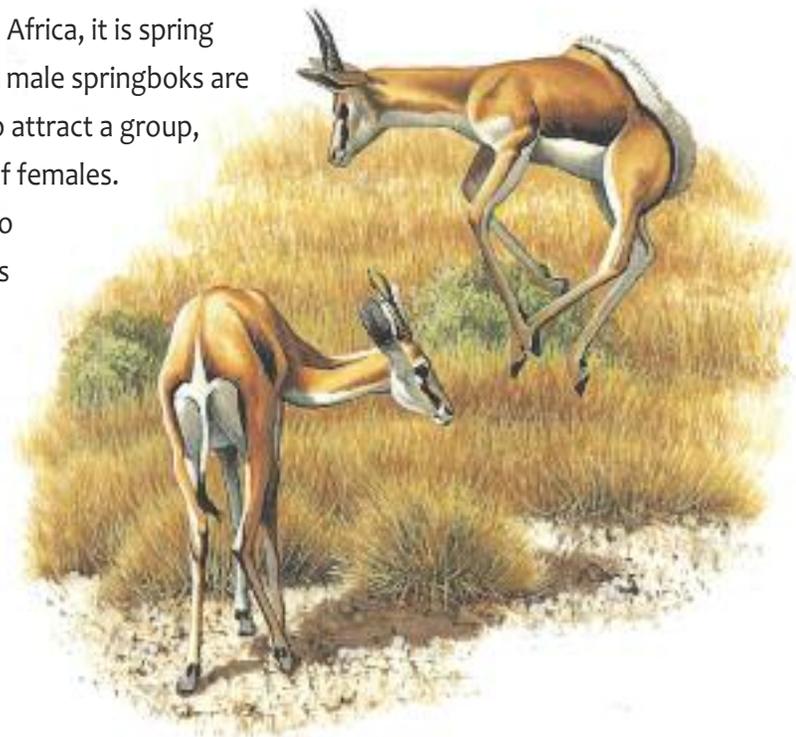


In September, sockeye salmon (*left*) complete their long journey upstream from their former home in the Pacific Ocean. Now they reach the headstreams in North America where they themselves hatched out. The salmon pair off and lay their eggs before they die.

In Africa, it is spring and male springboks are trying to attract a group, or “harem”, of females.

Salmon use their tails to scoop a basin in the river bed where they lay their eggs (*above*). Males leap high into the air—sometimes more than 3.5 metres off the ground (*right*). This is called “pronking”, Afrikaans for “showing off”. The springboks will mate in the coming rainy season.

*In the air, springboks stiffen their legs and arch their spines to display the white hairs down their backs (*right*).*





The snowshoe hare (above) gets its name from its fur-covered feet which help it to run on the snow.

## ARCTIC

**I**N NORTHERN REGIONS, some animals start to grow their winter coats. The snowshoe hare, for example, has grey-brown fur in summer. This starts to turn white and grow thicker in the autumn (left). Its winter coat helps provide camouflage in a snowy landscape as well as providing added warmth.

## EUROPE

**A**CROSS EUROPE, it is the start of the red deer “rut”, when males compete for the attention of females. Stags walk side by side to compare each other’s size and let out loud roars to

attract females and intimidate rivals (right). These displays mean that males can size each other up without necessarily needing to fight. However, if two stags refuse to step down, the pair will lock horns and try to throw each other off balance.

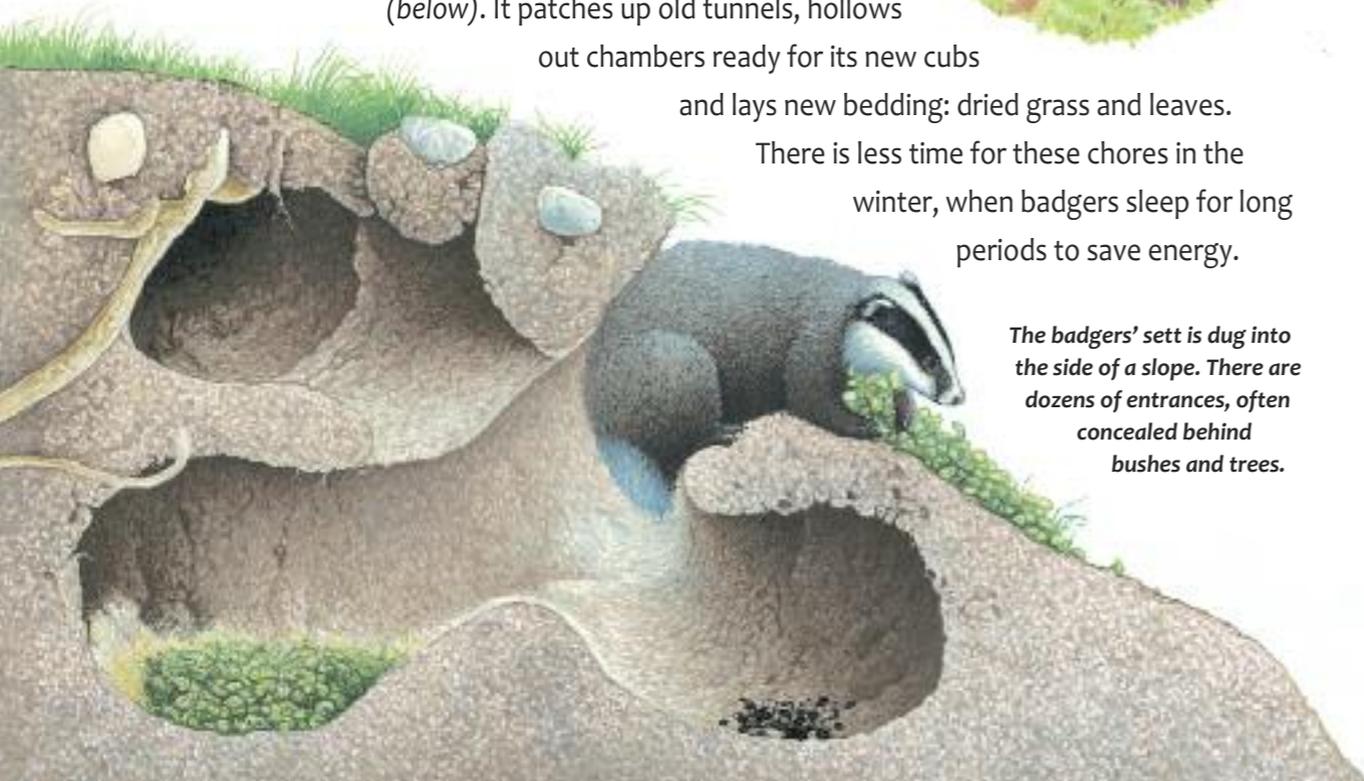


In a copse of trees, a badger spends time repairing its sett, an underground network of tunnels and nesting chambers (below). It patches up old tunnels, hollows out chambers ready for its new cubs

and lays new bedding: dried grass and leaves.

There is less time for these chores in the winter, when badgers sleep for long periods to save energy.

The badgers' sett is dug into the side of a slope. There are dozens of entrances, often concealed behind bushes and trees.



## NORTH AMERICA

**I**N SEPTEMBER, southern populations of bald eagles begin courtship (right). Bald eagles have the most acrobatic of all courtship dances. In a breath-taking display, they tumble and dive through the air, sometimes locking talons as they whirl and somersault high above the ground. Bald



Bald eagle couples plummet headlong towards the ground, often pulling out of the fall with only seconds to spare.

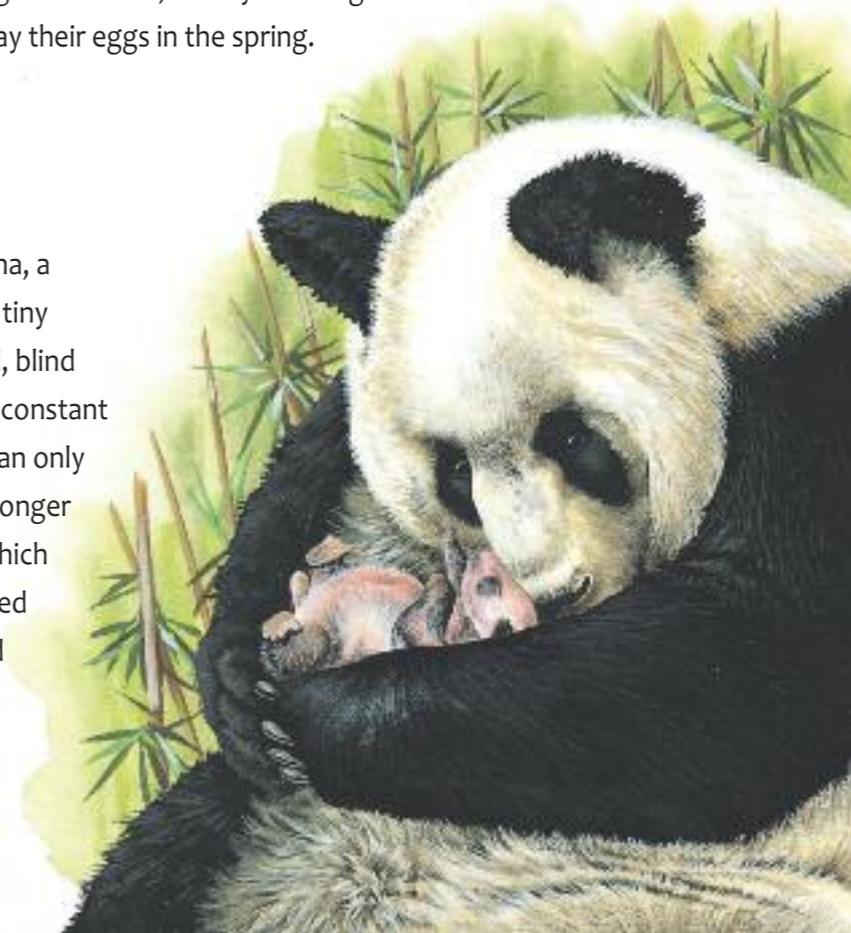
eagles mate for life and will repeat this display each breeding season.



As autumn draws closer, the monarch butterflies’ final young of the year hatch out. When it is big enough, a caterpillar spins a silk cocoon around its body, and changes into a butterfly (left). Most monarch butterflies live for less than two months, but this generation may live much longer. This is because they need to migrate south in the autumn, sleep through the winter, and fly north again to lay their eggs in the spring.

## NORTH ASIA

**I**N THE BAMBOO FORESTS of China, a pregnant panda gives birth to two tiny cubs. The newborn cubs are naked, blind and completely helpless. They require constant attention for months, so the mother can only care for one of them. She picks the stronger of the two and abandons the other, which will soon die. The surviving cub is carried about in its mother’s mouth or cradled in her arms. Two weeks after birth, its skin starts to darken in the places where its fur will grow black (right).





The giant anteater feeds on ants and termites, which it detects using its keen sense of smell. It breaks open their nests using its strong claws, then laps up the insects with its long, sticky tongue.

## SOUTH AMERICA

IN SEPTEMBER, FLYING termites emerge with the first rains and fly away to form new colonies. This activity provides an abundance of food for the giant anteater (above), which gorges itself on the insects. One individual can eat up to 30,000 insects in one day.

Meanwhile, many animals are courting before the summer breeding season. On the volcanic island of Bartolomé in the Galapagos Islands the local penguins court by grooming each other. They also take part in “bill duelling”, shaking their heads from side to side and knocking the tips of their beaks together (right).



A pair of Galapagos penguins court on the beaches of Bartolomé (below).

## INDIAN OCEAN

EACH YEAR, hundreds of manta rays migrate from the east coast of Africa to the waters around the Maldive Islands, where they breed.

Females are pursued through the water by groups of males. The males copy every move the female makes. Only the most persistent and attentive male will win her favour.



## AFRICA



IN SOUTHERN AFRICA, a female hornbill lays her eggs inside a tree hollow with its entrance sealed by mud. The male passes her food through a narrow slit in the tree (left). When the chicks are three weeks old, the female breaks out of the hollow. The chicks reseal the entrance with a mixture of wood chips and their droppings.

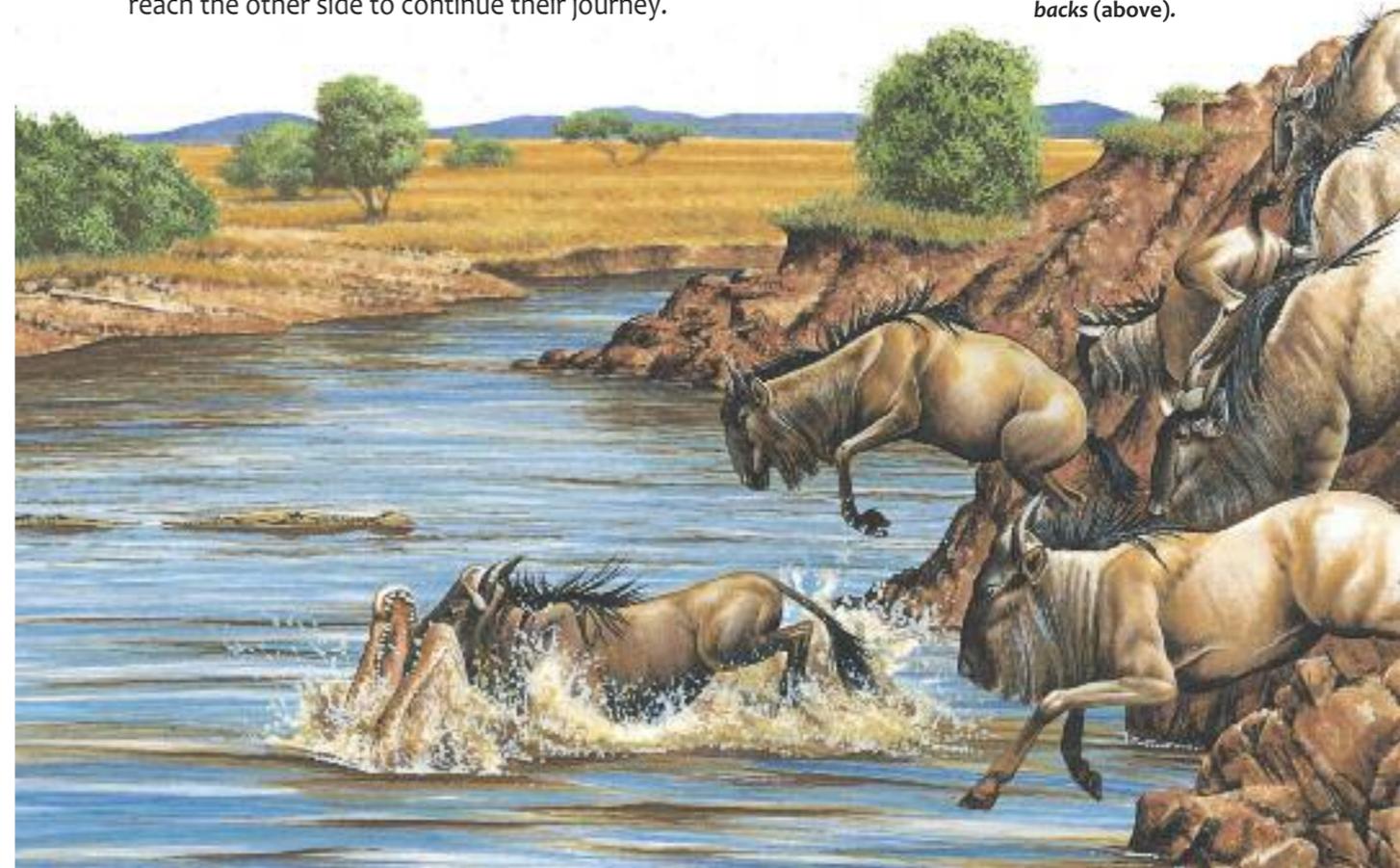
Wildebeest spend the year trekking across East Africa. They follow the rains in order to feed on the lushest grasses.

By September, their journey has taken them north into Kenya. When the rains move south again, the wildebeest must follow them. The direct route takes them straight across the Mara River.

The animals slide down the river bank and into the water. Some are swept away by the strong waters and drown. Others are pulled under by crocodiles, lurking just beneath the water’s surface. Most, however, reach the other side to continue their journey.

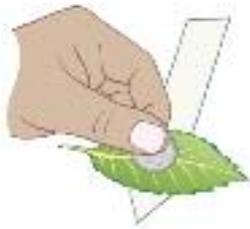


September is the coolest month on the island of Madagascar. Sifakas, born in July, start to ride around on their mothers’ backs (above).



# THINGS TO DO

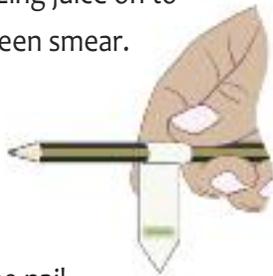
Leaves contain a green pigment, chlorophyll, which they use to make energy out of sunlight. They also contain pigments of other colours, which are usually hidden by chlorophyll. In autumn, the chlorophyll breaks down, revealing the other colours. This activity shows all the colours in a leaf.



- 1 Collect several leaves.
- 2 Cut a piece of blotting paper into a strip with a point at one end.

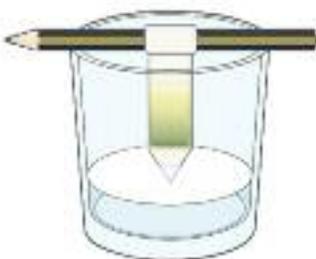
3 Place a leaf on top of the paper. Roll a coin firmly over the leaf, squeezing juice on to the paper and making a green smear.

4 Roll the end of the paper strip around a pencil and tape in place.



5 Ask an adult to pour some nail varnish remover or white wine vinegar into a jar. Do not spill it or get any near your eyes or mouth.

6 Balance the pencil on the rim of the jar, so that the paper just touches the liquid.



- 7 Watch as the liquid seeps up the paper, carrying the pigments with it.

In your local park, or on a country walk, pick up a handful of fallen acorns and conkers.



- 1 Choose two nuts that have not been cracked or squashed and place them in a bowl of water overnight.

3 The next day, place each nut in a pot with some soil and water them.



- 4 Keep an eye on the plant pots and make sure the soil never gets too dry.



5 If you are lucky, a tiny oak or chestnut tree will start to grow in the spring

## NATUREWATCH



Acorns or conkers

10



Leaves changing colour

20



Droppings

30



A squirrel with a nut

40



Deer rutting at dusk or dawn

50

How many of these things you can spot? Award yourself the points on the right!

# THE WORLD

## IN OCTOBER

**A**UTUMN comes to the Northern Hemisphere while the southern half of the world sees the arrival of spring. Falling temperatures in northern woodlands trigger many trees to shed their leaves. This protects them during the cold winter months.



As summer in the northern hemisphere fades, the leaves change colour. Greens turn to yellows, reds and browns as nutrients seep back into the tree. The woods of New England, USA are famous for their “fall” colours (above, right). Finally the leaves die and drop off. Trees then enter a sleep-like state in order to save energy over the cold winter months.



*A giraffe tends her newborn calf on the grasslands of East Africa (above). It is the end of the dry season. Soon the rains will arrive, bringing lush vegetation that the mother giraffe can make into milk for her baby.*

October is the month that animals in Europe, North America and Asia start to make plans for winter: they dig or restore their burrows, find somewhere to hibernate, or, to escape the cold altogether, set out on a long journey to warmer lands further south.

In parts of Africa and Australia, the onset of the rainy season means that there is suddenly more food to eat—a good time for the young to be born. The arrival of warmer weather in Antarctica prompts animals to start mating, so the young emerge into the world when food is abundant in the summer. Courtship begins in earnest.

*For reindeer, October in the Arctic lands is the mating or “rutting” season. Males, or bulls, battle it out with other bulls to gain the right to mate with females in their “harem”. They first roar at each other in a show of strength. If neither reindeer backs down, the pair lock antlers and try to knock each other over.*





Thrusting up among the dead leaves on the forest floor are mushrooms and toad-stools: both types of fungi (above).

## EUROPE

**A**UTUMN HAS ARRIVED in the woodlands of northern Europe. A badger has spent the summer nights gorging on its diet of earthworms, insects, fruit and small mammals. Autumn fruits and funghi now provide a rich supply of food (left). By winter, the badger will have built up the fat reserves it needs to survive the cold. It may lose around one-quarter of its body weight over the next few months.

At the same time, a queen bumblebee roams the undergrowth in search of somewhere dark and sheltered where she can sleep through the winter (right). She finds the perfect spot: a cavity beneath a tree root. In spring, she will emerge to start a new colony.



## ARCTIC

**F**OR FOUR MONTHS a pregnant polar bear has been eating vast amounts of food on the Arctic ice. Now, as winter sets in, she goes in search of a suitable place to dig her den—usually in a snowdrift on land just a few kilometres from the coast. There she rests, asleep most of the time (below). Her heartbeat is low, but, unlike true hibernators, her body temperature does not decrease. It is important that she ate enough food during the spring and summer, since she will not eat or drink again until she leaves the den with her cubs in March.

A female polar bear rests in her newly-dug maternity den, sheltered from the harsh Arctic winds.

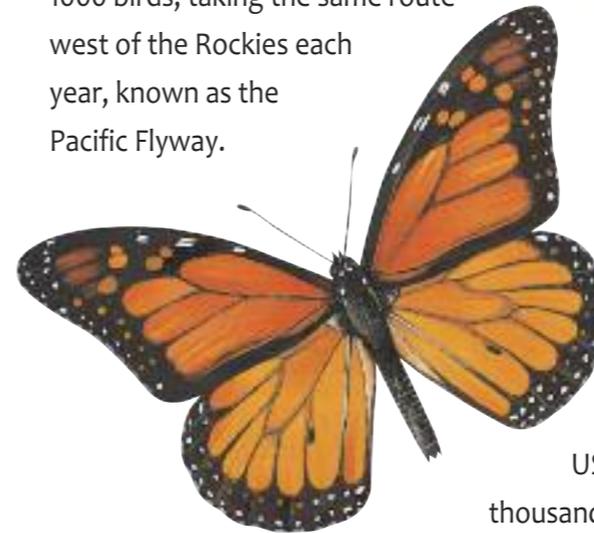


## NORTH AMERICA

**A**MID LOUD HONKS and hisses, a vast flock of snow geese touch down in the Klamath Basin on the southern border of Oregon, USA. They are on their way from their summer nesting grounds in the Arctic to spend winter in the warmer lands of southern USA and Mexico. They fly in flocks of up to 1000 birds, taking the same route west of the Rockies each year, known as the Pacific Flyway.



Unlike many geese, snow geese (above) do not fly in neat V-shaped formations, but snake across the sky in wavy lines.



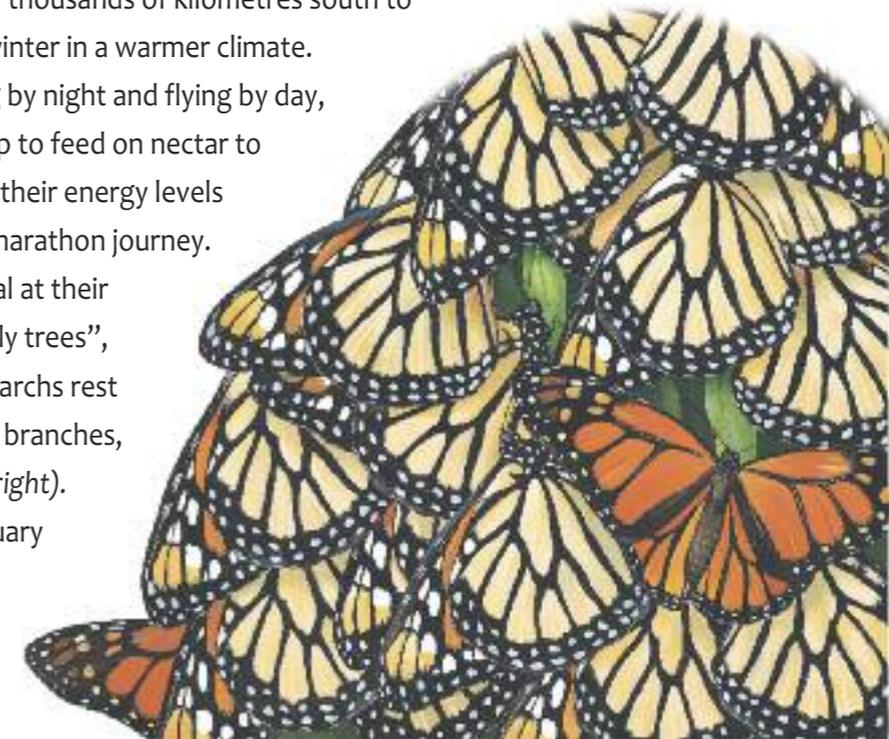
The monarch butterfly has a wingspan of up to 10 centimetres. Its bright colour is a warning to other animals that it is poisonous. But many butterflies are still eaten by hungry birds on their long and hazardous journey.

**E**VERY OCTOBER, regular as clockwork, trees in parts of southern California and northern Mexico, North America, become cloaked with thousands of butterflies. Hatched out in southern Canada and northern

USA, these monarch butterflies have flown thousands of kilometres south to overwinter in a warmer climate.

Sleeping by night and flying by day, they stop to feed on nectar to keep up their energy levels for the marathon journey. On arrival at their “butterfly trees”, the monarchs rest

huddled together on the trunks and branches, stirring only on milder, sunny days (right). They will set off north again in February or early March.



## ANTARCTICA

**I**T IS SPRING in Antarctica. Soon the waters off the coast will be teeming with fish and krill. Adélie penguins must begin breeding now, so that their chicks will have plenty to eat when they hatch out. But first they must make the journey to their rookery (breeding grounds).



Thousands of Adélie penguins set out across the Antarctic ice (left), on a journey of up to 50 kilometres inland, away from the summer thaw. The penguins are in a race against time to reach the rookeries and raise their young before returning to the sea in autumn.

Progress is slow: an Adélie penguin's stride is short—just 10 centimetres long. But when the ice is smooth, the penguins

slide along more quickly on their bellies. The penguins take nearly a week to complete their journey.

*Adélie penguins waddle across the Antarctic ice en route to their breeding grounds inland.*

**A**FTER NEARLY a year at sea, a wandering albatross lands on an island in the South Atlantic. It is late October and nearly the start of the breeding season, so she starts to look for a mate.

Albatrosses perform an elaborate courtship dance to help choose their mates. Wings outstretched, the birds shake their beaks and groan and croak before throwing back their heads. Two to three months after mating the female lays a single egg.



*Two albatrosses perform an elaborate courtship dance. If one albatross fails to perform the dance properly, it may be a sign that it is ill or injured, and not a suitable parent.*

## AFRICA

**S**EPTEMBER RAINS have ended the long drought in northeast Africa. Female desert locusts have laid many more eggs than usual in the damp, sandy soil. A month later, the young, wingless locusts, called hoppers, hatch out—in their millions. The hungry locusts strip the land of all crops and greenery.

As the locusts crowd around clumps of vegetation, their legs rub against each other, triggering the behaviour

that makes them swarm. Solitary locusts are camouflaged, but swarming locusts, protected by their vast numbers, moult to reveal bright colours.

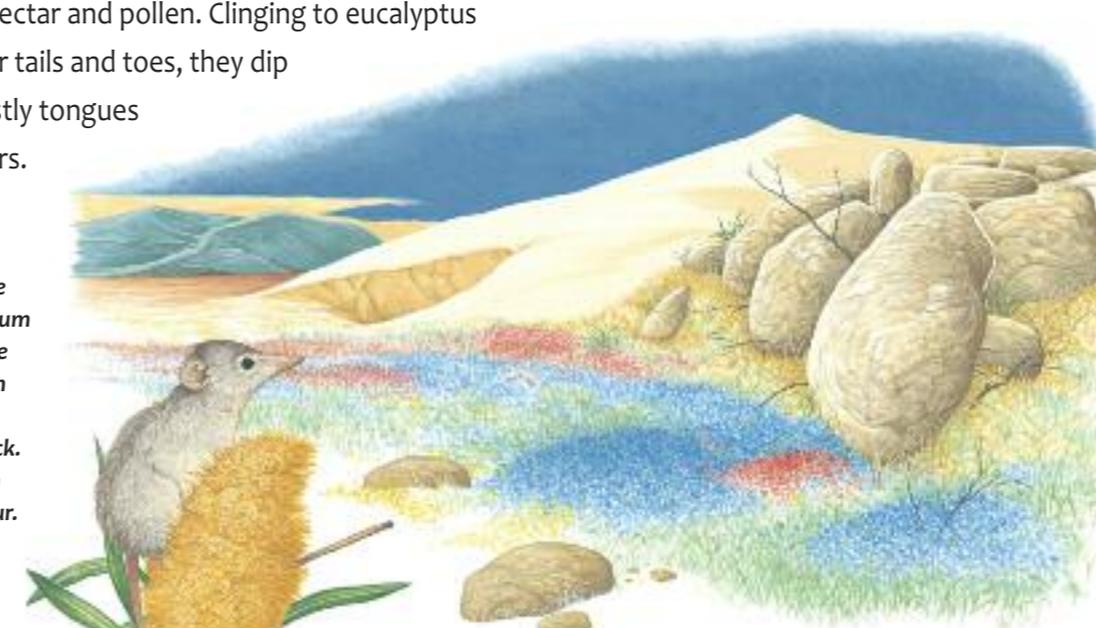


*A swarm of 50 billion locusts are swept across the countryside by winds. This is bad news for farmers like those from this boy's village (above).*

## AUSTRALIA

**W**ITH THE ARRIVAL of spring in the desert of Western Australia—and the only rains this region will see all year—the normally barren landscape suddenly bursts into flower. The plants mature very quickly and drop their seeds all in a few weeks. Brought out by the bright colours and the strong scents, birds and insects sip the nectar. At night, mouse-sized honey possums join in the feast. They are one of the very few mammals that lives only on nectar and pollen. Clinging to eucalyptus shoots by their tails and toes, they dip their long, bristly tongues into the flowers.

*A honey possum takes a night-time sip from a coral gum flower, part of the "desert bloom" in the Western Australian outback. As it feeds, pollen dusts its brown fur.*

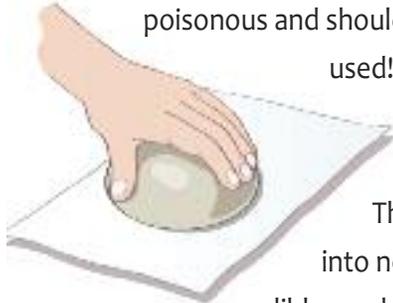


# THINGS TO DO

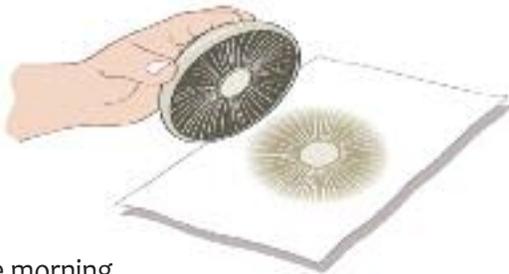
**B**efore you start this activity, please remember that some fungi (also called mushrooms or toadstools) are



poisonous and should not be used! A dust-like powder, called spores, is scattered by fungi.



These spores can grow into new fungi. Place an edible mushroom cap on to a piece of paper and leave overnight.



In the morning, lift the mushroom cap up very carefully. You will see that it has left patterns of spores on the paper. The spores can easily fly off or smudge. To avoid this, ask an adult to spray them gently with craft glue or hairspray.



Fallen leaves cover the ground during October. Try to find as many different leaves as you can. Press the leaves in a big, heavy book (phone books work well) for 2-3 days, then stick them on to a piece of paper. You can use clear sticky-back plastic to fix them into position. Then write down the details about the tree from which the leaf came.



## NATUREWATCH

	Fallen leaves	10
	Mushrooms and toadstools	20
	Birds flying in V-formation	30
	Nibbled nuts and acorns	40
	A fresh burrow	50

# THE WORLD

## IN NOVEMBER

**A**NIMALS IN THE northern hemisphere are busy making preparations for the coldest months ahead. In rivers and ponds, fish, frogs and turtles move to the deepest waters where it is warmer. Some, such as carp, even bury themselves in the mud. In the southern hemisphere, warm weather and longer hours of daylight prompt a flurry of animal activity.

Bighorn sheep (*below, left*) live on mountain slopes across North America.



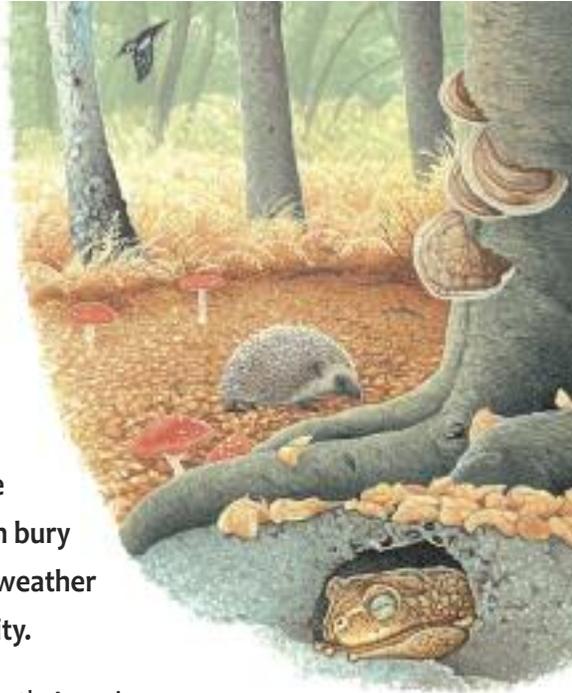
*Nile crocodiles (below) lay between 55 and 60 eggs, each about the size of a hen's egg. Mothers fiercely guard their clutch until the youngsters hatch out.*

Before the mating season begins, rams fight over ewes, crashing into each other head first.

Bighorn rams have a double layer of bone at the front of their skull with a spongy layer between.

This absorbs the impact when they fight.

On a river bank in East Africa, a Nile crocodile digs a hole in which to lay her eggs (*below*). She covers them with sand to keep them warm and settles down to watch over them for the next three months. Unguarded eggs might be eaten by mongooses, snakes or lizards, or could rot if exposed to wet weather. At the first sign of rain, the mother positions her body over the eggs to protect them from the downpour.



*A hedgehog starts to look for a place to spend the winter (above). Meanwhile, a toad begins its long hibernation.*

# ARCTIC

**I**N THE ARCTIC WINTER, many animals change colour for better camouflage against the snowy landscape. Among those that turn white is the stoat, a ferocious predator, sometimes attacking animals over twice its own size. Stoats will search for prey inside burrows or in other likely hiding places. Their slim bodies enable them to follow animals into narrow tunnels and hunt them underground or beneath the snow in spaces



*In winter, lemmings burrow under the snow as they search for moss. This lemming has little chance of escape now a stoat has found its burrow.*

such as this lemming burrow (above, right).

# EUROPE

**B**Y NOVEMBER, many northern hemisphere birds have flown south to warmer regions. Those that stay behind gather in huge flocks and roost in their hundreds to keep warm. Roosting not only helps the birds to stay warm, but also makes it easier for them to spot predators and find food. With many more eyes looking for food, the birds can cover a large area as they forage. Birds may find food by seeing another bird eating, or by observing older, more experienced birds with a better knowledge of where to look.



Along remote coastlines in Europe, grey seals gather to mate and raise their young (right). Each female gives birth to a single pup covered with soft white fur. Three weeks after giving birth, the female moves down the beach in search of a mate. Males fight fiercely over females.



*Mother and pup bond quickly, learning each other's voices and scent. Pups suckle on their mother's milk for nearly three weeks.*

*Mantees, a relative of elephants, live in warm, shallow waters, grazing on seagrass and other plants. Mothers and their calves often rub against each other and sometimes "kiss" by touching noses.*



# NORTH AMERICA

**M**ANATEES SPEND most of the year in seagrass meadows in the

Caribbean Sea (above). But in November, they move north to the waters off the coast of Florida. Despite their size, manatees have relatively little body fat, and cannot survive in waters below 20°C. In the lagoons and estuaries of Florida, natural springs keep the water warm throughout the year. A few manatees even gather in warm-water inlets close to power plants. In spring, the manatees return to the freshly replenished seagrass meadows of the Caribbean.



*Red octopus young hatch in November and drift with the ocean currents (above). Many will be eaten before they can grow into adults.*

In southern USA, bald eagle couples are preparing to breed (right). Pairs mate for life, returning to the same nest year after year.

Every breeding season, the eagles bring fresh nesting material to repair and enlarge their nests. The largest nests can measure up to six metres across.



## AFRICA

**I**N CENTRAL AFRICA, a black rhinoceros has just given birth (left). Her calf can be on its feet when it is just hours old, but it will stay with its mother for up to three years. At all other times, rhinos are solitary animals, displaying aggression if they meet. The mother will defend her calf fiercely should danger approach.



Mother and calf form a tight bond (above).

A baby flying fox clings to its mother, hanging on tightly with its sharp claws and teeth (below, right).

## AUSTRALASIA

**H**ANGING UPSIDE DOWN in a high treetop, a flying fox gives birth to its young (right). The infant instinctively crawls down its mother's body to find a teat. It will not fly for four months, so it clings to its mother wherever she goes.



3000 kilometres away, on Christmas Island, millions of red crabs are migrating to their breeding grounds (below). The crabs usually live in the island's forests, but still return to the sea to mate. They face a number of obstacles along the way, crossing roads and even scrambling through houses.

Males reach the beaches first and dig burrows in the sand. When the females arrive they mate and the males leave. Females stay in the burrows while their eggs develop in a brood pouch under the tail. When ready, the females crawl to the water at high tide and shake the eggs into the water. About 25 days later, the tiny crabs, just 5 millimetres across, crawl out of the water and head inland.



## ANTARCTICA

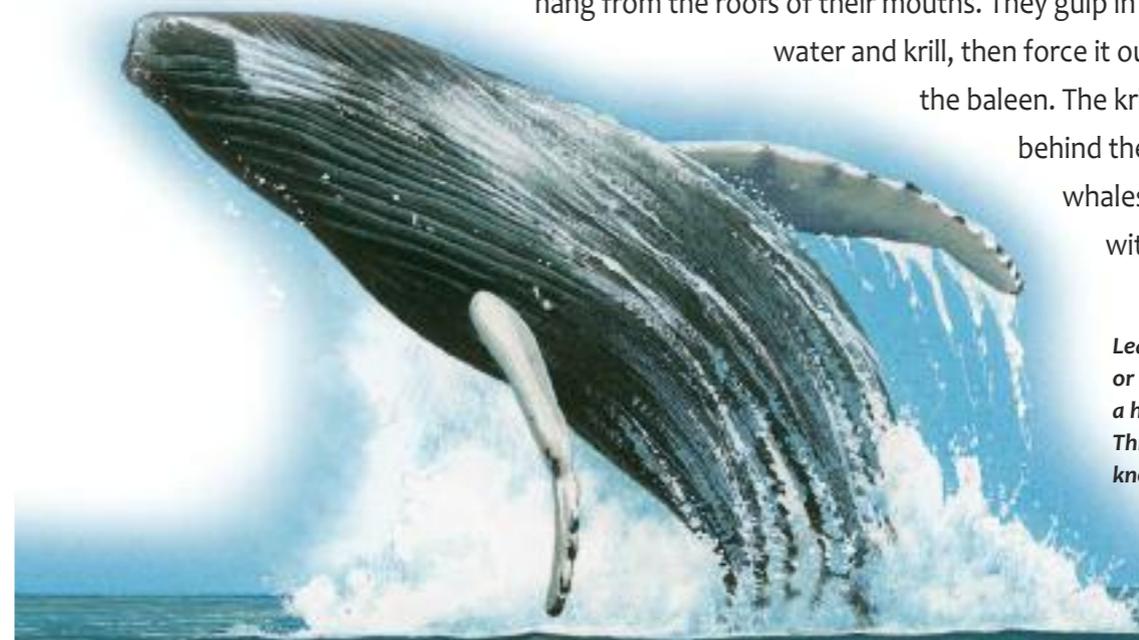
**I**N ANTARCTICA, warmer temperatures cause plankton—tiny plants and animals in the water—to multiply. Attracted by the plentiful food, fish and whales migrate to the waters and resident animals start breeding.



King penguin chicks are on the brink of adulthood. This 10-month-old's adult feathers are coming through (above).

By November, Adélie penguins have reached their breeding grounds, called rookeries (above, right). Large crowds make it easier to find a mate and provide some safety in numbers from great skuas and petrels. Males arrive first, and set about building a nest by piling up pebbles. Once the females arrive, the penguins couple and the female lays one or two eggs. Parents take turns to incubate the eggs while their partner feeds.

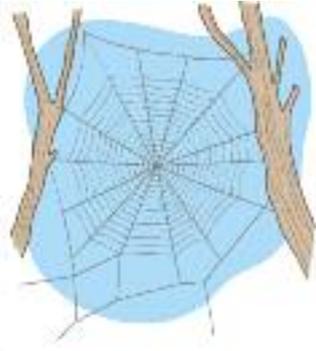
**I**N THE SOUTHERN SUMMER, humpback whales migrate to their feeding grounds in the waters around Antarctica. They need to eat several tonnes of krill each day. Instead of teeth they have bristly plates, called baleen, that hang from the roofs of their mouths. They gulp in mouthfuls of water and krill, then force it out again through the baleen. The krill gets caught behind the baleen and the whales scrape it off with their tongues.



Leaping into the air, or breaching, makes a huge splash (left). This lets other whales know it is around.

# THINGS TO DO

**O**n cool mornings, spider webs may be lined with drops of dew or even tiny ice crystals. Try this activity to make your own “frosted” spider web.

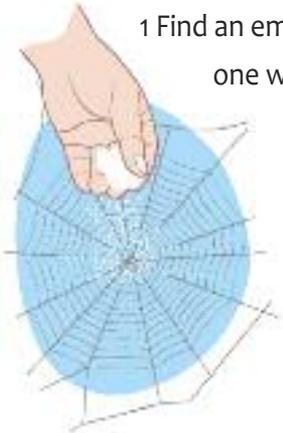


*In autumn, squirrels are busy burying nuts for the winter. But will they remember where the nuts are buried several weeks later?*

*Next time you go for a walk, collect a handful of acorns or other nuts. Hide them under leaves or push them gently into the ground.*

*Go away for 10-15 minutes, then return to the area. Can you find where all the nuts were hidden?*

1 Find an empty spider web—choose one without a spider living on it!



2 Lightly sprinkle a little flour on to the web. For the best results, pour some flour into the palm of your hand and gently blow it at the web.

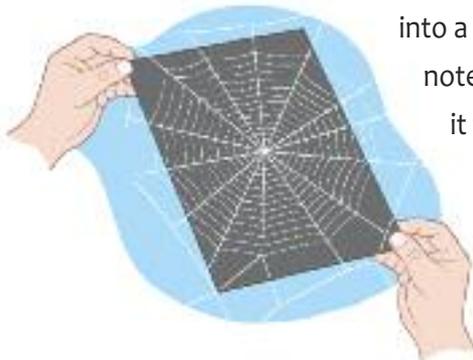


3 Ask an adult to spray a piece of black card or paper with craft glue or hairspray.

4 Hold the card behind the web and bring it forwards so that the web sticks to the sticky surface of the card.



5 Stick your spider web into a nature notebook or use it to make a greetings card.



## NATUREWATCH

 Clusters of berries **10**

 Large flocks of starlings **20**

 Old man's beard **30**

 Ladybird's indoors **40**

 Birds roosting **50**

See how many of these things you can spot. Award yourself the points on the right!

# THE WORLD

## IN DECEMBER

**I**N THE NORTHERN hemisphere the shortest day of the year approaches. In temperate regions there is little food to be found: birds search for berries, while hungry mammals, such as rabbits and deer, strip bark off trees. Meanwhile, it is high summer in the southern hemisphere.

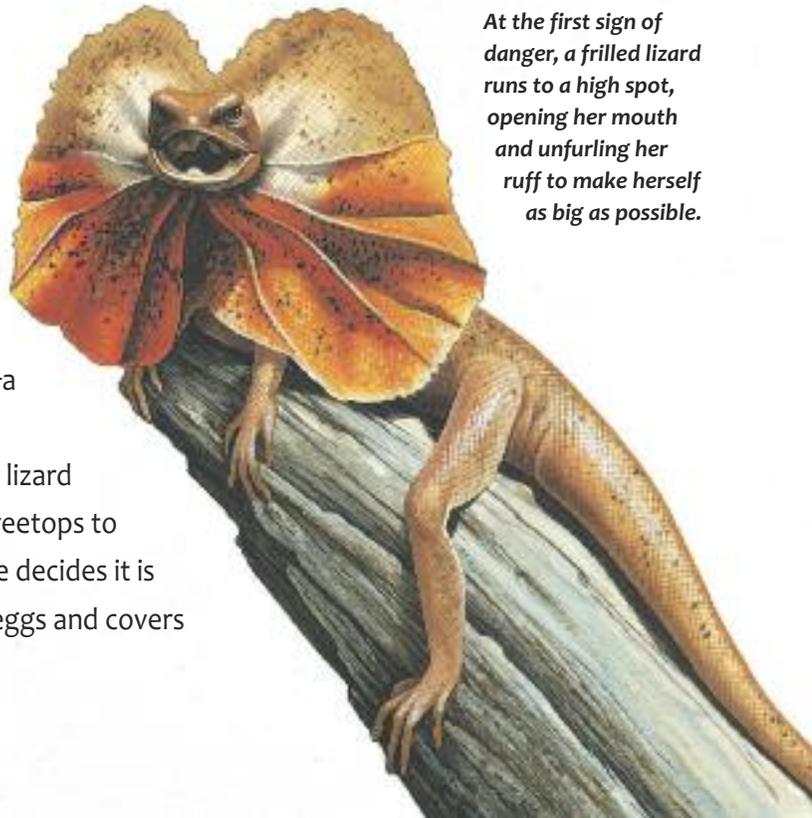
In autumn and winter, huge schools of scalloped hammerhead sharks congregate in the waters off Central America (*below, left*). The sharks gather in deep waters around seamounts (underwater mountains), close to their main feeding areas. During the day, the sharks show no interest in food, but at night they split into smaller groups to feed on squid and stingrays.



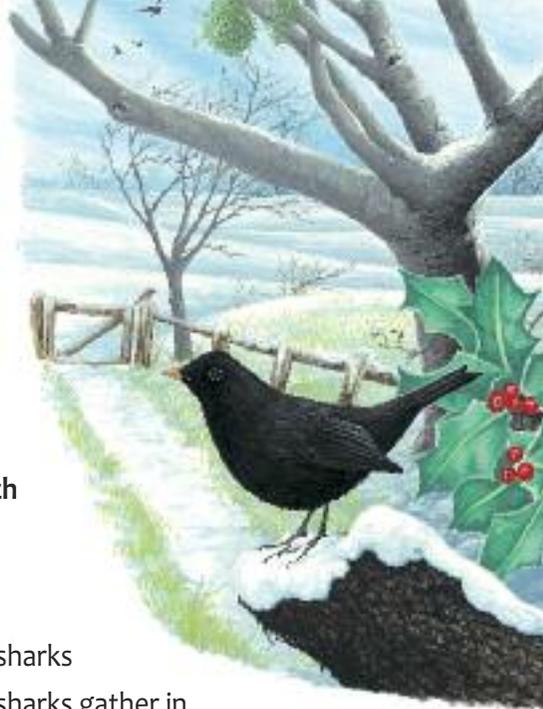
*The hammerhead shark's head shape (above) gives it 360-degree vision. Its head also contains sensors, which detect electrical signals given off by other creatures.*

lay her eggs in the ground. As soon as she decides it is safe, she digs one or two holes, lays her eggs and covers them over with soil.

In Australia, it is the start of the monsoon season—a long period of very heavy rain. A frilled lizard (*right*) leaves the treetops to



*At the first sign of danger, a frilled lizard runs to a high spot, opening her mouth and unfurling her ruff to make herself as big as possible.*



*In Europe, a blackbird sings to ward off rival males (above). Behind him, holly and mistletoe are both bearing berries. .*



## ARCTIC

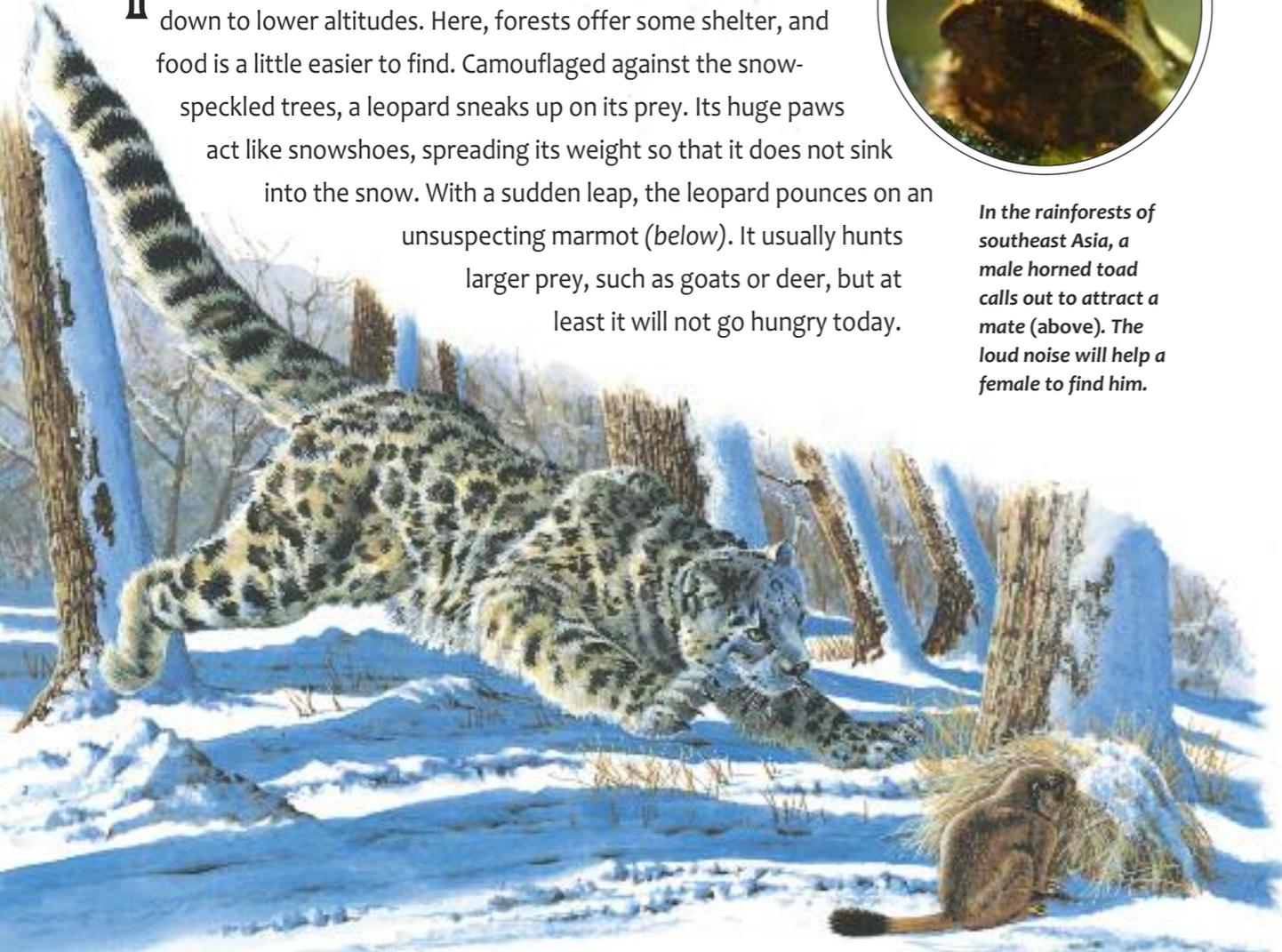
**I**N HER DEN, deep inside a snowdrift, a polar bear gives birth to two tiny cubs. Little larger than guinea pigs, the cubs are blind, naked and helpless. Over the next three months, they will feed on their mother's milk and stay close to her, nestling in her fur for warmth. The igloo-like maternity den also keeps them sheltered from icy winds and the Arctic cold.

## CENTRAL ASIA

**I**N THE DEPTHS OF WINTER, snow leopards leave the exposed mountain slopes where they usually hunt and follow their prey down to lower altitudes. Here, forests offer some shelter, and food is a little easier to find. Camouflaged against the snow-speckled trees, a leopard sneaks up on its prey. Its huge paws act like snowshoes, spreading its weight so that it does not sink into the snow. With a sudden leap, the leopard pounces on an unsuspecting marmot (below). It usually hunts larger prey, such as goats or deer, but at least it will not go hungry today.



*In the rainforests of southeast Asia, a male horned toad calls out to attract a mate (above). The loud noise will help a female to find him.*



## NORTH AMERICA



*Male elephant seals have a long, trunk-like snouts, which they inflate to amplify their roars during fights with other males for dominance (above).*

At the start of the mating season, males fight for dominance. They rear up and crash into each other, slashing at their opponents' thick skin with their sharp teeth. Females arrive after the males, and group at the other end of the beach to give birth to pups, conceived last winter. Only once the pup is weaned will a female be ready to mate again. Dominant bulls may mate with up to 100 cows.

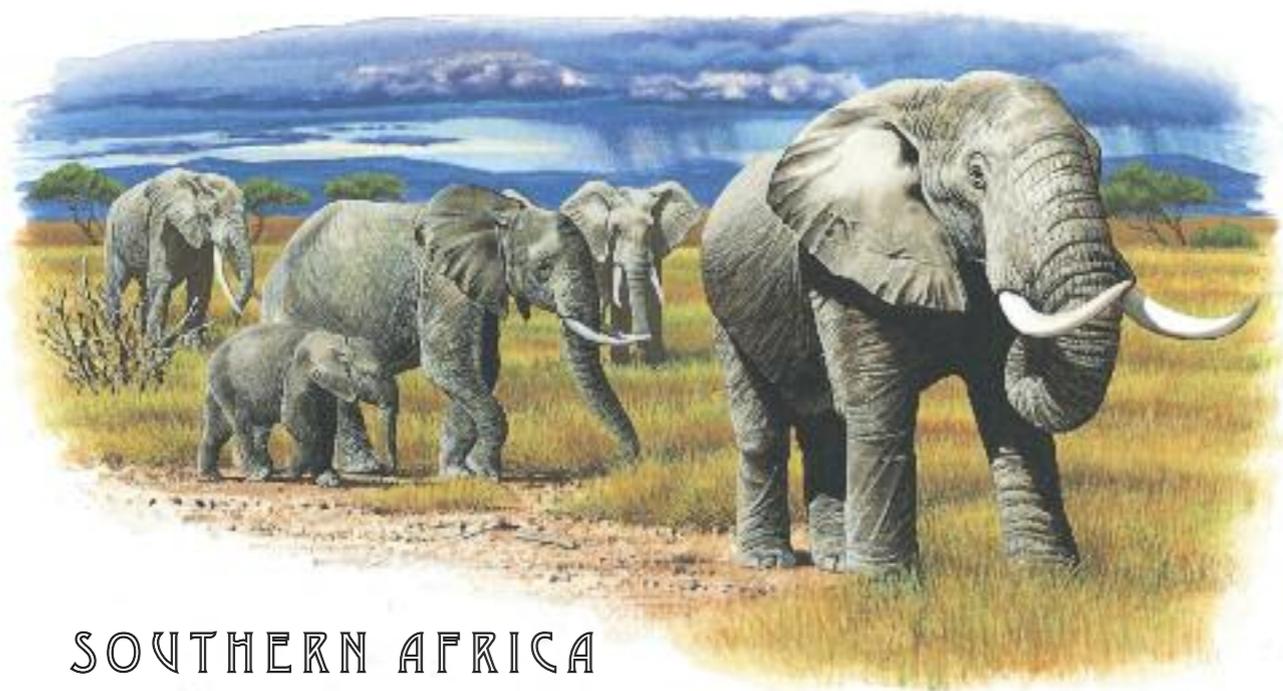


Camouflaged in a bed of bracken in California, a poorwill hibernates through the winter (left). It is the only bird known to do so. The poorwill, known as *holchko*, or "sleeping one", by native Indians, may hibernate for about three months while food is scarce.

*Newly-hatched salmon (below) are called alevins. They still have balloon-like yolk sacs attached to their bodies. These provide the young fish with food for about a month.*

**I**N THE AUTUMN, thousands of sockeye salmon swam up the rivers of their birth to spawn. Now, three months later, their pea-sized eggs are hatching out. After a month, the salmon, now called fry, leave their gravel nest and slowly make their way down-stream. After several months, they develop stripy markings, at which stage they are known as parr. Parr spend up to three years in fresh water before swimming towards the sea.





## SOUTHERN AFRICA

THESE ELEPHANTS HAVE spent the three-month dry season in a sheltered forest, avoiding the heat and foraging for food. The grasses they usually eat withered and died months ago. Since then, they have been feeding on whatever they could find—mainly shoots, bark and roots. Thankfully, the rains return in December. The elephants can finally leave the forest and head for open grassland, where lush, young shoots will soon start to grow. Several families of elephants travel together, led by the matriarch, the oldest cow in the group.

*November brings rains to the Kalahari Desert. Insects multiply, providing plenty of food for meerkat families. In their burrows, mothers give birth to up to five babies (below).*



## EAST AFRICA

IN EAST AFRICA, it is the end of the rainy season. Although giraffes will cope quite easily in the coming dry season, they drink as much as they can while the river waters are still high. Because their legs are so long, they have to splay them wide to reach down far enough to take a drink.



## AUSTRALIA

AT THE START of the mating season, male palm cockatoos employ a clever technique to attract a female. The male makes a drumstick from a small twig and beats it against the trunk of a hollowed nesting tree. The noise he makes can be heard up to 100 metres away.

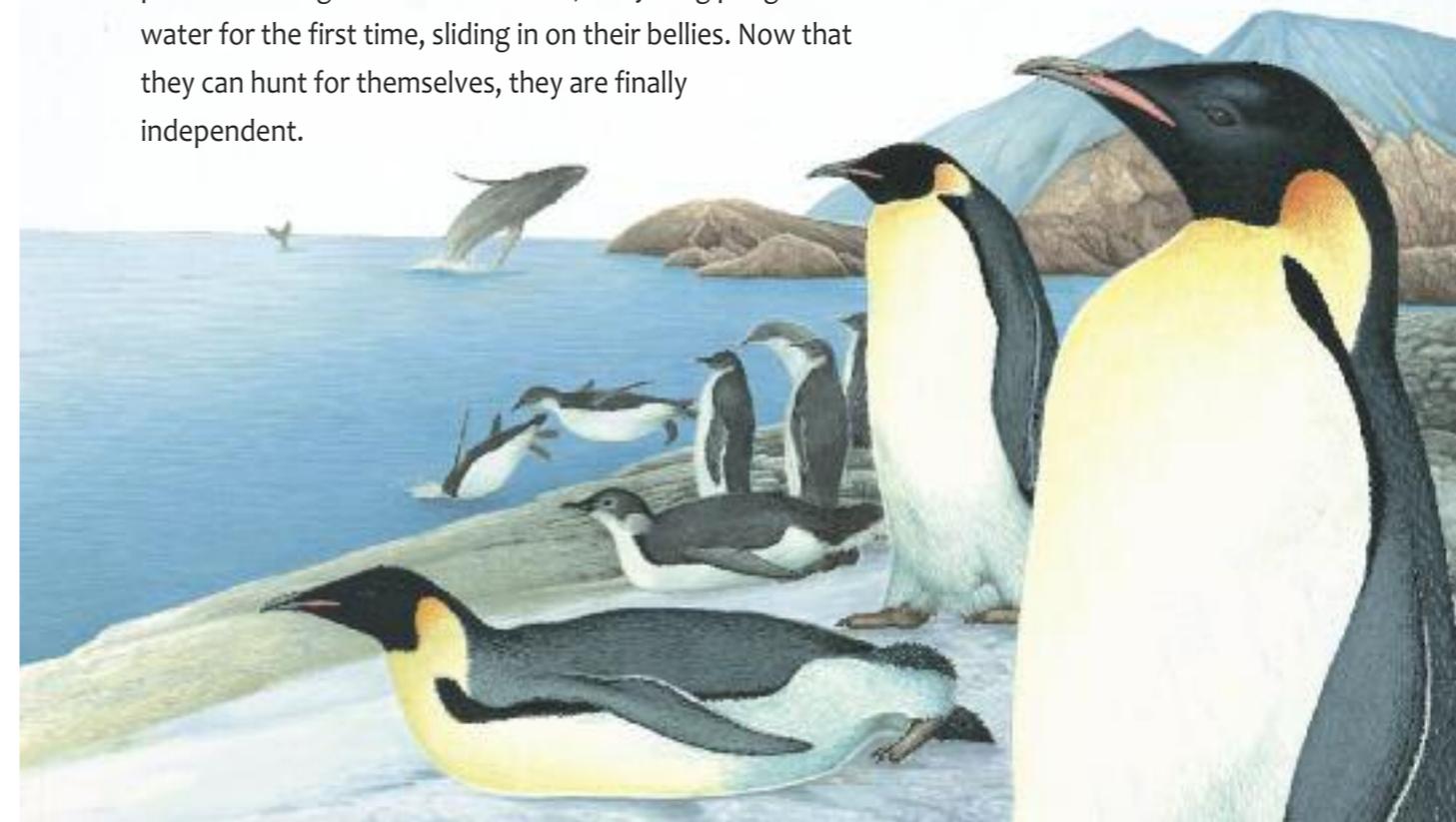
A female, attracted by the noise, watches the male's performance carefully. If she is interested, she will inspect the nest, give her approval and fly away with her new mate. After mating, the female lays a single egg, which hatches out a month later.



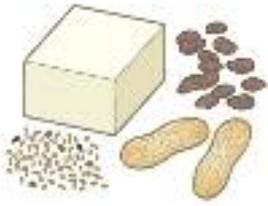
*The male cockatoo selects a small twig and trims it to just the right shape. He then clasps it in his foot and beats it against a hollow tree trunk (above).*

## ANTARCTICA

THREE MONTHS AGO, the emperor penguin colony set off from their inland crèches towards the sea. Along their journey, both the adults and the young moulted. The young penguins, already at their full size, grew an adult coat of waterproof feathers. It will be another year before they develop the yellow-orange markings of their parents. Having arrived at the coast, the young penguins take to the water for the first time, sliding in on their bellies. Now that they can hunt for themselves, they are finally independent.



# THINGS TO DO



Give the birds in your area a hand this winter by making a bird feeder.

1 Using a sharp pencil, make a hole in the base of a yogurt pot. Thread a piece of string through the hole and knot it inside the pot.

2 For your mix you will need lard, birdseed, raisins and peanuts (not salted or roasted).

3 Cut the lard into blocks and leave it out of the fridge to soften for an hour or two.

4 Mix the ingredients together in a bowl.



5 Put the mixture into the yogurt pot and pack it down firmly.

6 Leave the feeder in the fridge for the mixture to set.

7 Tie the feeder to a branch. Always make sure feeders are out of the reach of cats and dogs.



8 You could also put out a bowl of water. Birds will use it for drinking and may wash themselves in it, too.



Conifers are evergreen trees with long, narrow leaves, called needles. Needles are tough and can survive wind, frost and drought.

1 Look for conifers, such as firs and pines in your park or garden. If you get a Christmas tree, this will be a conifer, too.



2 Scrape the surface off one pine needle using a fingernail.



3 Beneath this waxy surface there is a sticky liquid that nourishes the tree during the winter. You will be able to see this through a magnifying glass.



## NATUREWATCH



Holly berries 10



Mistletoe 20



A teasel head 30



Bark nibbled by animals 40



An owl 50

How many of these things you can spot? Award yourself the points on the right!