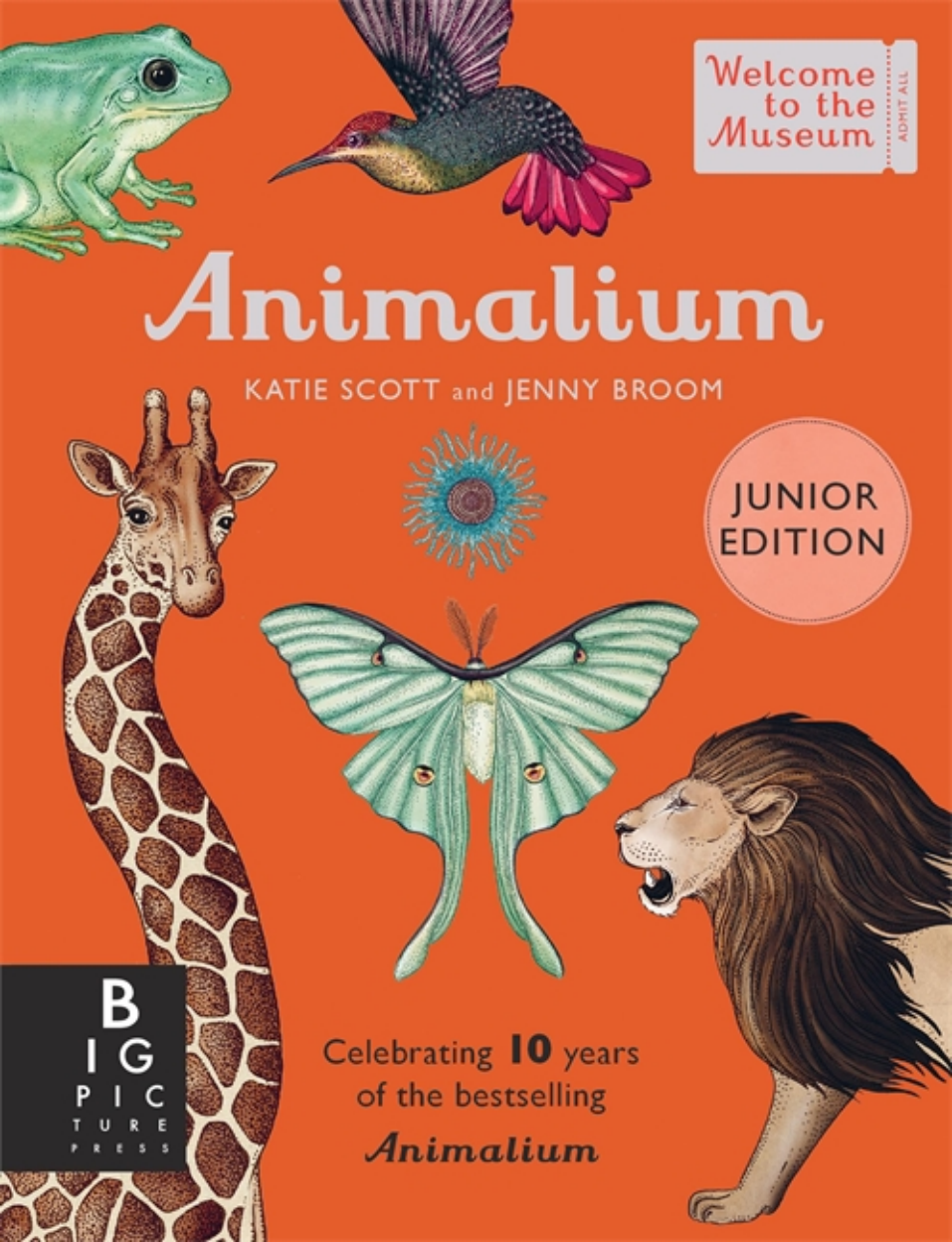

Animalium

KATIE SCOTT and JENNY BROOM

JUNIOR EDITION

Celebrating **10** years of the bestselling *Animalium*

BIG PICTURE PRESS

Animalium

Illustrated by KATIE SCOTT

Written by JENNY BROOM

B P P

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Entrance

Welcome to Animalium

This book is laid out like a museum with lots of rooms for you to explore. Open twenty-four hours a day, seven days a week, it houses some of the world's most amazing creatures. Prepare to admire everything from beautiful butterflies to impressive elephants.

Wander through the pages of the museum to tour its galleries and see how life on Earth gradually unfolded. Each of the six chapters introduces a different class of animal: invertebrates, fish, amphibians, reptiles, birds and mammals. From simple sea sponges to primates, discover how the huge range of animals we know and love today came to be.

Stop to gaze at extraordinary exhibits including the mysterious 'living fossil' and the largest egg on Earth. Passing through the museum's halls, explore the coastal, rainforest, desert, woodland and arctic habitats encased inside terrariums. See how different species have adapted over millions of years to perfectly suit their environment.

This is the only museum to house animals ancient and modern, enormous and tiny, vicious and vulnerable. It's time to enter *Animalium* and see the animal kingdom in all its glory.

ANIMALIUM

Gallery 1

Invertebrates

Invertebrates

Squids and Octopuses

Flying Insects

Habitat: Coastal Waters

Invertebrates

Invertebrates are grouped together not because they have things in common, but because they all lack one important feature: a jointed back. Making up around 97 per cent of the animal kingdom, invertebrates vary wildly from the simple sponge to the intelligent octopus. They are split into related groups (such as flatworms, segmented worms and molluscs) and can be found almost everywhere on Earth: in water, in the air, on land and even underground!

Most species of invertebrate appeared around 540 million years ago, making them Earth's first animals. Sponges evolved from single-cell creatures to become the very first animals. They can't move or think so it's easy to mistake them for plants, but they feed on bacteria and can sense and react to their underwater environment.

Next came the cnidarians, a wide ranging group. Some, such as sea anemones, attach themselves to rocks, while most types of jellyfish can move freely through the water. While cnidarians kill and eat animals to survive, they are 'passive predators' which means they wait patiently for their prey and then sting them to death!

Key to plate

1: Black sea nettle
Diameter: 91cm

2: White-spotted jellyfish
Diameter: 47cm

3: Pacific sea nettle
Diameter: 27cm

4: Dahlia anemone
Diameter: 12cm

5: Staghorn coral
Diameter: 2m

6: Brain coral
Diameter: 2m

7: Stalked jellyfish
Diameter: 15cm

8: Blue button jellyfish
Diameter: 2.5cm

9: Flowerpot coral
Diameter: 1m

Squids and Octopuses

The cephalopod family – which includes squids and octopuses – dominated the seas several million years before fish existed. Around 800 species of cephalopod can now be found in every ocean on Earth.

Their large brains and impressive senses make them sociable creatures able to communicate with one another. They have sucker-like tentacles and move by taking in water and then shooting it out to move forward by jet propulsion.

Cephalopods can change the colour and pattern of their bodies to camouflage themselves and scare off predators. They also produce ink and, when threatened, they release an inky cloud which confuses predators. Some can even produce a ghost-like cloud a similar size, shape and colour to their own body, which acts as a decoy and means the clever cephalopod can escape.

Key to plate

1: **Long-armed squid**
Mantle length: 12.5cm
This slow-moving, alien-like squid lives at depths of up to 2.4km.

2: **Whip-lash squid**
Mantle length: 10cm
The long, whip-like tentacles of this squid are covered in tiny, sticky suckers.

3: **Angel octopus**
Mantle length: 16cm
This deep-sea octopus lives at depths between 200–700m.

Flying Insects

Insects are arthropods (which means they have a hard outside called an exoskeleton) and are closely related to crustaceans (crabs and lobsters) and arachnids (spiders and scorpions). There are at least one million species of insects, and around 10,000 new species are identified every year!

Insects are the only invertebrates that can fly and were the first herbivores on Earth. Plants and insects have evolved together over millions of years. Plants have found ways to defend themselves from being eaten by insects while, at the same time, relying on them to spread their pollen and allow them to reproduce.

All insects metamorphosise as they mature, which means they undergo a series of changes to their bodies. The wondrous transformation from caterpillar to butterfly is perhaps the most well-known example.

Key to plate

1: **Blue Mormon butterfly**
Wingspan: 13cm
This butterfly is found in rainy areas such as evergreen forests.

2: **Crane fly**
Wingspan: 4cm
This nocturnal insect has long detachable legs.

3: **Mayfly**
Wingspan: 1.5cm
Adult mayflies live for just one hour.

4: **Emperor dragonfly**
Length: 7.8cm
This species rarely lands, eating in flight.

5: **Atlas moth**
Wingspan: 30cm
This moth has the largest wings of any insect, but no mouth to feed with. Because of this, they only live for 1-2 weeks.

6: **Pale snaketail dragonfly**
Length: 5cm

7: **Plains lubber grasshopper**
Length: 5cm
This grasshopper can jump over one metre!

8: **Luna moth**
Wingspan: 10cm
The pattern on this moth's wings means it can easily camouflage itself in trees and fallen leaves.

9: **Common green grasshopper**
Length: 2cm

10: **Common wasp**
Length: 1.4cm
When attacked, this wasp sends out a call to others to come and help.

11: **Great black wasp**
Length: 2.8cm
This wasp paralyses its prey with its sting, then carries its meal to an underground nest to feed its young.

Habitat: Coastal Waters

Coastal habitats appear where the sea meets the land. They are areas of constant change as waves, tides and currents continuously affect the landscape. Despite these challenges, life in coastal areas is the richest in the world. With rivers flooding into the sea and waves constantly eroding the land, there's a never-ending source of nutrients.

Many of the creatures that live in coastal waters, such as crabs, limpets and scallops, have hard shells which protect them from the sharp rocks and powerful currents. Some, such as mussels, can open their shells, allowing them to sift the water for food, while others hunt for prey hiding in crevices.

Some areas of the coast are above the water at low tide and below the water at high tide. Many animals that live in these areas – known as intertidal zones – have cement glands that allow them to anchor themselves to a rock and stay put as the tides rise and fall. Others, like starfish and octopuses, have powerful suckers on their arms which help them to grip slippery surfaces.

Key to plate

1: Northern short-fin squid
Mantle length: 14cm

2: Crown jellyfish
Diameter: 20cm

3: Bushy-backed sea slug
Length: 10cm

4: Calico crab
Width: 7.6cm

5: Lettuce sea slug
Length: 5cm

6: Blue mussel
Length: 7.5cm

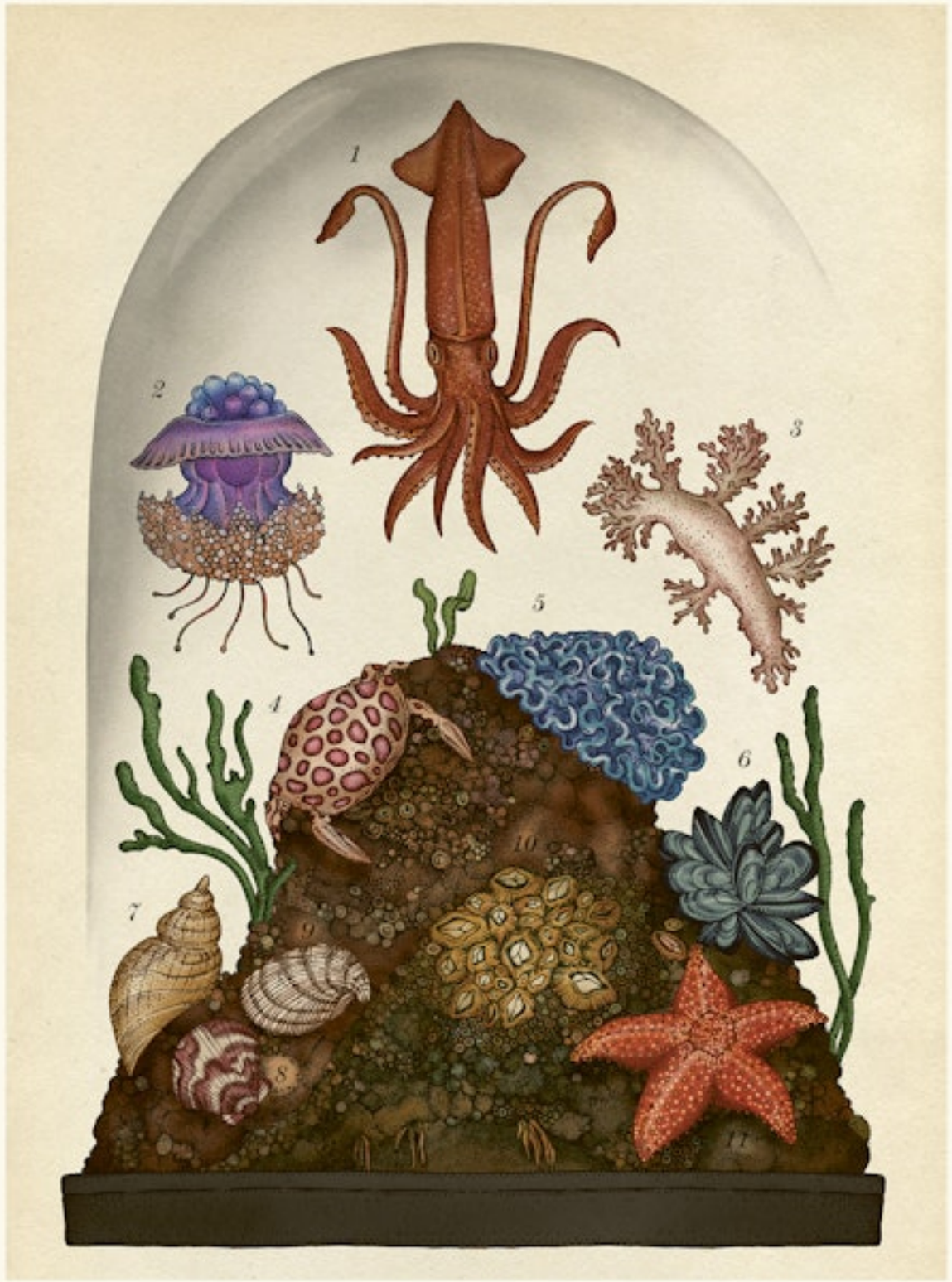
7: True tulip snail
Length: 13cm

8: Calico scallop
Length: 8cm

9: Striped venus clam
Length: 4cm

10: Little grey barnacle
Length: 9mm

11: Cushion star
Diameter: 24cm



Gallery 2

Fish

Fish

Sharks

Skates and Rays

Habitat: Coral Reefs

Fish

Fish are cold-blooded and live in nearly all types of water – fresh, salty, freezing and tropical.

Ray-finned fish make up nearly 99 per cent of all species of fish, so they come in a huge variety of colours, shapes and sizes. They were the first animals to form a jointed backbone, which means they can make quick and complex movements such as moving backwards. Most of these fish lay eggs, sometimes millions of them to try and improve their chance of survival. Smaller species of ray-finned fish swim together in large shoals, sometimes made up of thousands of individuals, to reduce the risk of being eaten by a predator.

Lobe-finned fish, such as coelacanths, have round, fleshy fins which almost look like arms and legs. Around 395 million years ago, some lobe-finned fish evolved to live on land. They adapted to breathe air and walk, eventually leading to the animals we know today, starting with amphibians through to reptiles, and later, birds and mammals.

Key to plate

1: **Red mullet**
Length: 25cm
The colour of this ray-finned fish varies depending on its mood, depth in the water and the time of day.

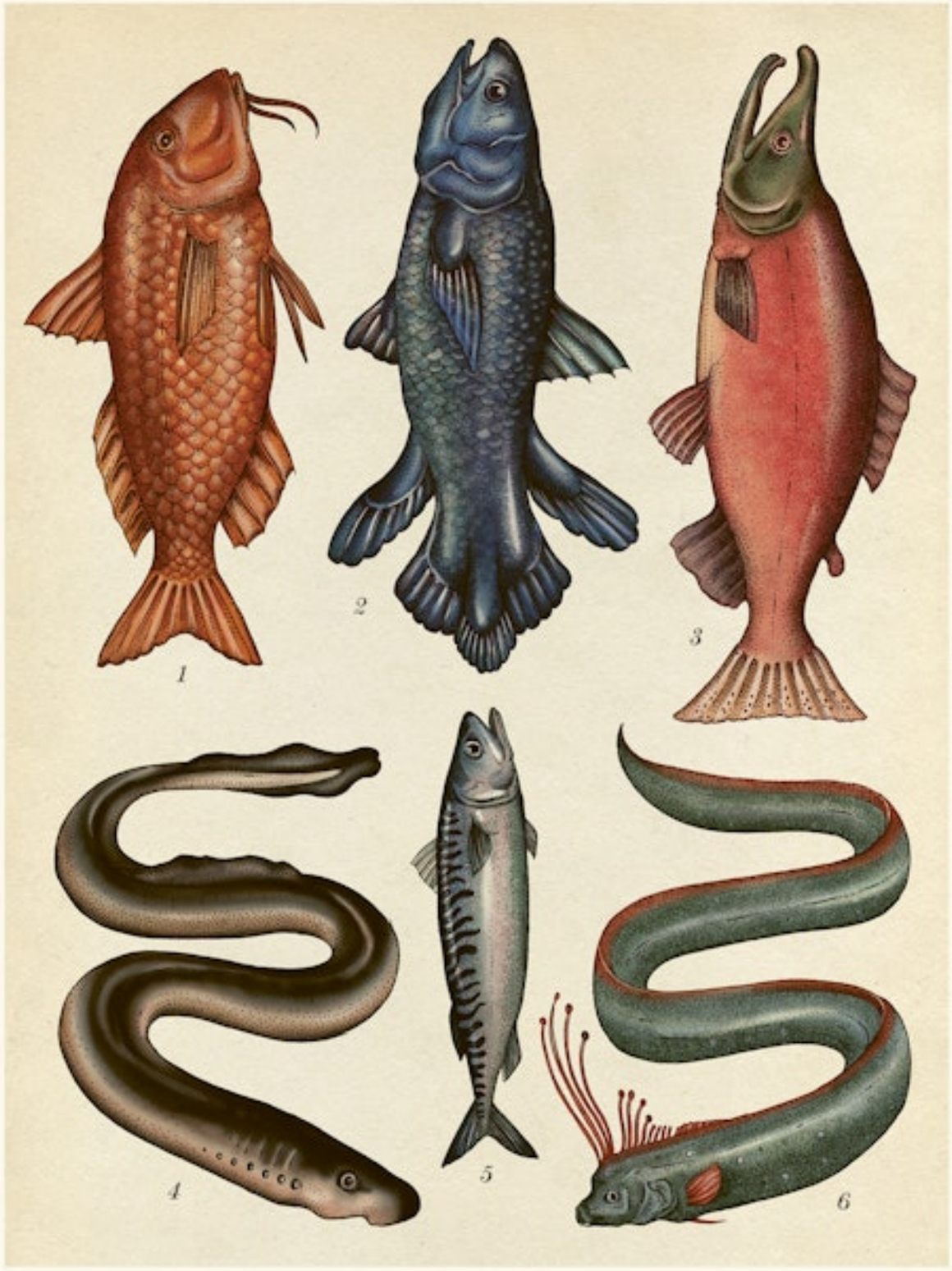
2: **West Indian Ocean coelacanth**
Length: 1.5m
Known as the 'living fossil', this is the oldest-known living species of lobe-finned fish. It was thought to be extinct until one was caught in 1938.

3: **Sockeye salmon**
Length: 72cm
This ray-finned fish spends its early life in freshwater lakes before swimming out to the Pacific Ocean. In order to spawn, it swims back to its birthplace.

4: **Sea lamprey**
Length: 60cm
This ancient, primitive fish is jawless and appears to have evolved very little from the species that lived 300 million years ago. It attaches to its prey using its sucker-like mouth full of sharp teeth, and draws out the flesh of its victim.

5: **Atlantic mackerel**
Length: 30cm
Fast and streamlined, this fish migrates long distances.

6: **Giant oarfish**
Length: 3m
This ray-finned fish is recorded as the longest species of fish by the Guinness World Records.



Sharks

There are more than 470 species of shark. The great white shark is perhaps the most famous and can grow up to 6.1 metres long, making it the largest predatory fish on Earth. Most sharks, including the great white, give birth to live young (just 25 per cent lay eggs).

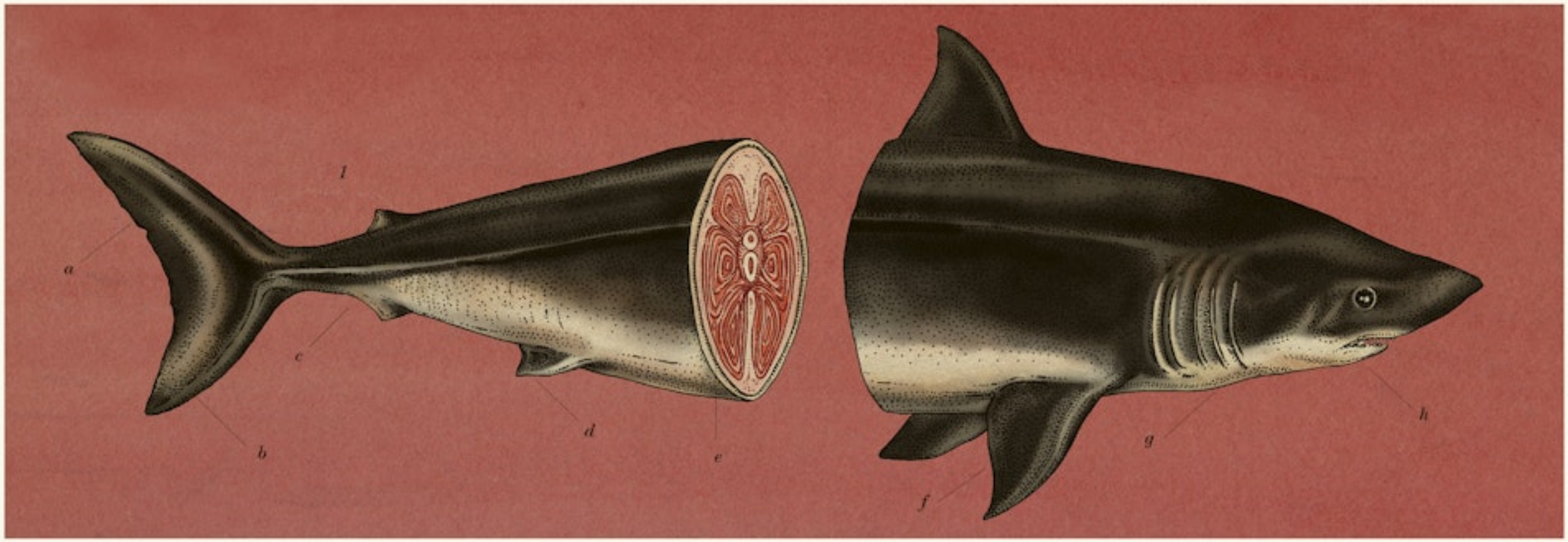
Sharks are cartilaginous fish: instead of hard bone they have skeletons made of cartilage which makes their bodies lighter and more flexible. Unlike other fish, sharks have rough skin with tough scales, called dermal denticles, instead of smooth scales.

Another difference between sharks and other fish is that sharks don't have a gas-filled bladder to keep them afloat. Instead, they rely on their oily liver and a force called dynamic lift to stay at the right depth, cruising through water like birds do in air. This means that most sharks cannot move backwards, and if they stop moving, they begin to sink.

Sharks have very good senses and can even detect the weak electrical signals given off by their prey. This is called electroreception. Special blood cells keep sharks' brains and eyes warm, giving them quick reactions. Their several sets of teeth grow constantly with blunted teeth being replaced by a new razor-sharp set waiting behind.

Key to plate

1: **Great white shark**
a: Upper caudal fin
b: Lower caudal fin
c: Anal fin
d: Pelvic fin
e: Spine
f: Pectoral fin
g: Gills
h: Jaw



Skates and Rays

Skates and rays are cartilaginous fish (see page 20) and are closely related to sharks. There are subtle differences between skates and rays, but the tail is the easiest way to identify them – rays have a whip-like tail with venomous spines whereas a skate's tail is stockier and doesn't have any stinging spines. Both fish have 'wings' that they use to swim by beating them like a bird. Some species even leap out of the water.

To hunt, skates and rays hide on the seabed, waiting for prey. A skate or ray will settle its broad, flat body – which is often covered with a camouflaging pattern – on the ocean floor. It will flap its wings to stir up the sand, and cover itself. Amazingly it's able to breath through spiracles behind its eyes. The fish cannot use its eyes to see when hiding in this way however, so it uses its senses of smell and electroreception to find and hunt prey.

Key to plate

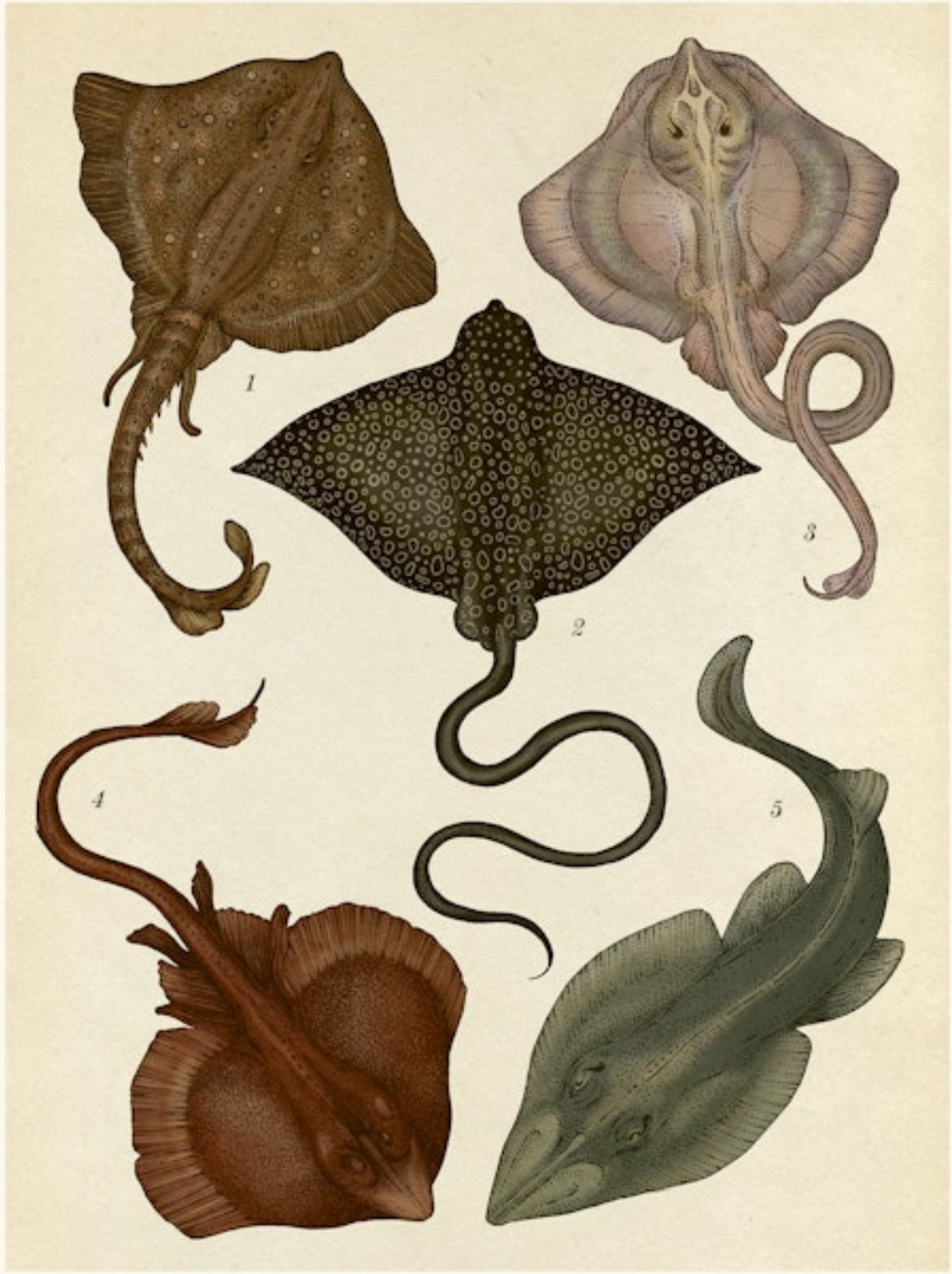
1: **Thornback ray**
Length: 85cm
The eggs of this kite-shaped ray are encased in black leathery sacs, commonly known as mermaid's – or devil's – purses.

2: **Spotted eagle ray**
Length: 1.8m
The spotted eagle ray is typically found in shallow tropical waters.

3: **Blonde ray**
Length: 1m
The blonde ray, named for its sandy colour, can be found throughout the waters of Europe and the Mediterranean.

4: **Smooth skate**
Length: 59cm
The heart-shaped smooth skate is a relatively small species and can be found in the waters of the north-west Atlantic.

5: **Shovelnose guitarish**
Length: 1.1m
The shape of the shovelnose guitarfish's dorsal fin initially led people to believe it was a shark, but it is in fact a species of ray.



Habitat: Coral Reefs

Coral reefs can be found in warm, clear, shallow parts of the ocean, and are colourful environments bursting with life. The reefs are hard, stony structures gradually formed over thousands – even millions – of years by tiny animals called coral polyps. Although they cover less than one per cent of the world's surface, these habitats support around 25 per cent of all marine species.

Over 4,000 species of fish can be found living in coral reefs, and they are among the most vibrant and varied species in the world. Brightly coloured, the fish are able to camouflage themselves and confuse predators. Many keep to small areas and become familiar with every nook and cranny of the corals making it easy to hide when they need to. Some also have long snouts which they use to delve into the coral polyps, flattened bodies that let them pass through tight spaces, and long ray-fins which allow sharp and quick movements in and out of the coral.

Key to plate

1: **Banggai cardinalfish**
Length: 8cm
This fish is most active in the morning and feeds until sunset.

2: **Mandarinfish**
Length: 6cm
This shy, slow fish hides from predators in coral.

3: **French angelfish**
Length: 40cm
A young French angelfish has yellow bands which fade as it gets older. The adult fish is black with yellow flecks.

4: **Stoplight parrotfish**
Length: 30cm
The parrotfish feeds in coral reefs throughout the day. At night, it creates a mucous sac that acts like a sleeping bag, which means predators can't smell it.

5: **Clown anemonefish**
Length: 8cm
This fish lives in a group of one female and several males.

ANIMALIUM

Gallery 3

Amphibians

Amphibians

Frogs

Habitat: Rainforests

Amphibians

Amphibians are cold-blooded and lay jelly-like eggs. Most have small lungs but are also able to breathe through their skin, which means they can stay underwater without coming up for air.

They were the dominant animals on Earth about 10 million years ago. Unchallenged by predators and with a warm climate that suited them, some grew to be bigger than crocodiles! However, 250 million years ago reptiles grew in strength and numbers and eventually took over.

Modern amphibians fall into three families: urodeles, caecilians and frogs and toads. Most species still have four limbs, although the worm-and-snake-like caecilians have adapted to their burrowing lifestyle by having strong skulls and no limbs at all.

The urodele family includes salamanders and newts. Like other amphibians, they have smooth, moist skin which absorbs oxygen. This is such an effective skill, that some species have no lungs at all. Another key feature of salamanders and newts is their amazing ability to regrow a lost limb!

Key to plate

1: **Axolotl**
Length: 20cm
While most amphibians end up living on land, this salamander spends its whole life in water.

2: **Mandarin salamander**
Length: 15cm

3: **Darwin's frog**
Length: 3cm

4: **Allen's worm salamander**
Length: 13cm

5: **Tomato frog**
Length: 10cm

6: **Ornate horned frog**
Length: 18cm
Nicknamed 'Pac-man', this frog uses its huge mouth to ambush prey.

7: **White's tree frog**
Length: 9cm

Frogs

While all amphibians experience big changes during their life, frogs experience a 'complete' metamorphosis. Most hatch from large batches of eggs laid in water and spend their first days as larvae known as tadpoles. These tadpoles have tails and gills that allow them to breathe underwater.

Soon after hatching, the tadpoles start to grow lungs, four legs and a large jaw. Their gills and tails gradually disappear as they prepare to move from water to land and the tadpoles are transformed into insect-eating frogs.

Many species of frog have interesting ways of caring for their offspring. Some, such as the male Darwin's frog, nurture their young in their mouth, while others, such as the female pouched frog, allow their eggs to develop in a skin sac on their back.

Key to plate

European common frog
After hatching, it takes 12–16 weeks to turn from a tadpole into an adult.

1: Frogspawn
2: Tadpole
3: Tadpole develops legs
4: Young froglet
5: Adult frog

Habitat: Rainforests

Tropical rainforests are hot, humid areas. They experience lots of rain throughout the year so are full of luscious trees and plants. Amphibians are particularly well suited to this habitat: there are more than 1,000 different species of frog in the Amazon Basin alone! The warm, swampy environment allows amphibians' skin to stay moist (and therefore breathable) without having to stay close to ponds or rivers.

In order to travel from tree to tree, some frogs have developed the ability to glide. Using flaps of skin on their sides and between their toes, they stretch out as they fall through the air and can travel distances of up to 15 metres.

Some of the best-known species of frog, such as poison dart frogs, live in rainforest habitats. Their brilliantly coloured skin warns predators of their deadly poison, which is caused by their diet of toxic ants.

Key to plate

1: **Blue poison dart frog**
Length: 4.5cm
This frog has glands all over its skin which produce poisonous toxins.

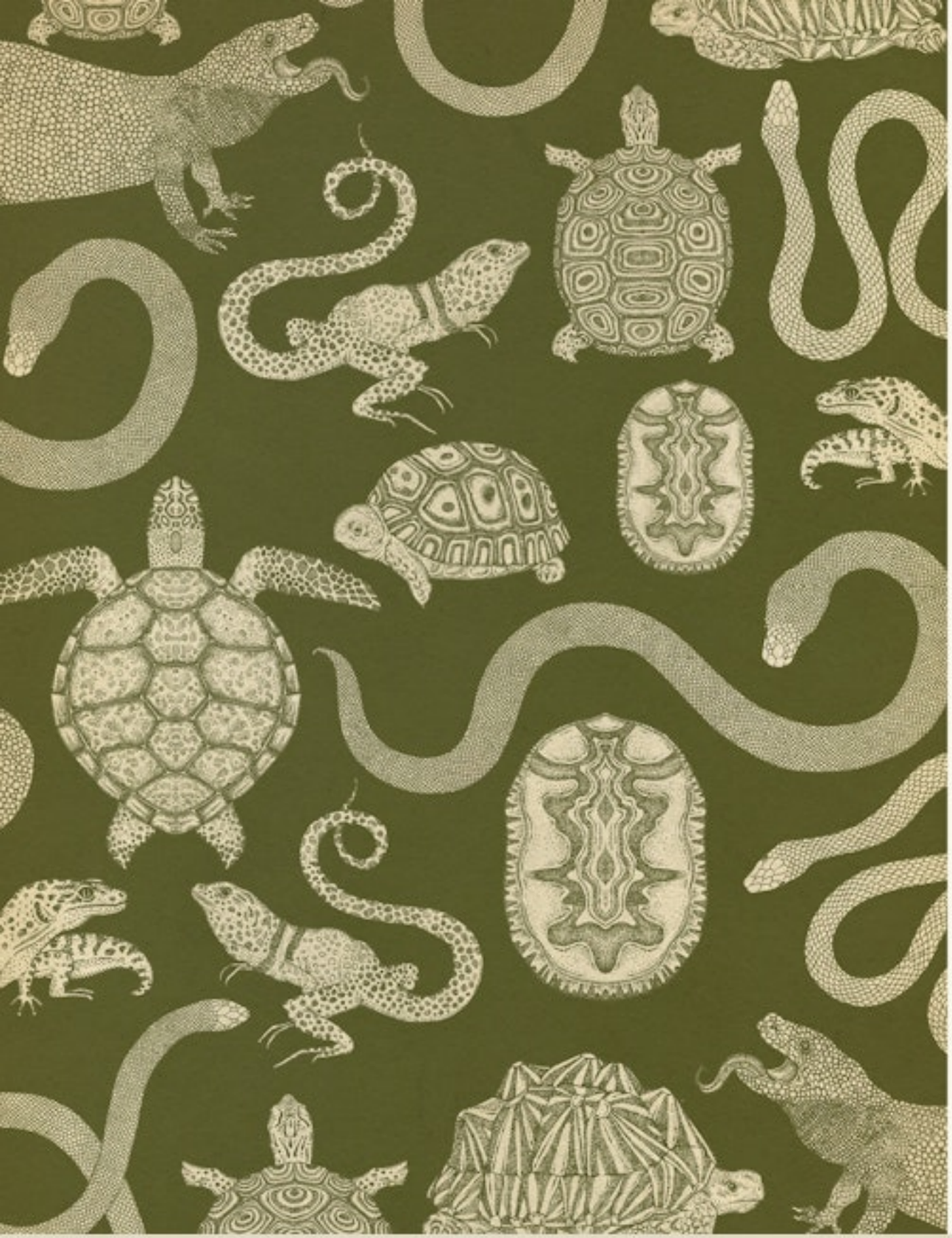
2: **Red-eyed tree frog**
Length: 6.4cm
Suction cups on the underside of its feet make this frog an excellent climber.

3: **Waxy monkey leaf frog**
Length: 7.6cm
This frog sandwiches its eggs in a leaf above a pond. When the tadpoles hatch, they drop into the water.

4: **Granular poison dart frog**
Length: 2cm
The male of this species establishes its breeding ground by calling constantly.

5: **Cerro Pando salamander**
Length: 6cm
This rarely seen salamander has slightly webbed fingers and toes.

6: **Thompson's caecilian**
Length: 1m
This is the largest of the worm-like caecilians. From Colombia, it is endangered due to deforestation.



ANIMALIUM

Gallery 4

Reptiles

Reptiles

Snakes

Crocodiles and Alligators

Habitat: Deserts

Reptiles

Reptiles were the first animals to live land-based lives, thanks to scales that allowed their bodies to stay moist. They were also able to walk more easily on land than amphibians and were able to lay eggs and therefore reproduce on land. They had few predators so grew in size and number until they reached their height of power as dinosaurs. Dinosaurs reigned over the animal kingdom for around 135 million years, until a mass extinction around 65 million years ago. After that, reptiles became smaller and fewer in number.

Modern reptiles share many characteristics with their dinosaur ancestors: they are cold-blooded and regulate their body temperature by moving between sun and shade. Many can lose and then regrow a limb, and some, such as chameleons, can even change colour.

Turtles are members of an order of reptiles called Testudines, which also includes tortoises and aquatic terrapins. A modern turtle's anatomy is very similar to its prehistoric ancestors', who date back more than 220 million years. Their shells are attached to their bodies so their protective armour can never be taken off or left behind.

Key to plate

1: **Green sea turtle**
Length: 1.5m
This large sea turtle is a herbivore, feeding mostly on seagrasses.

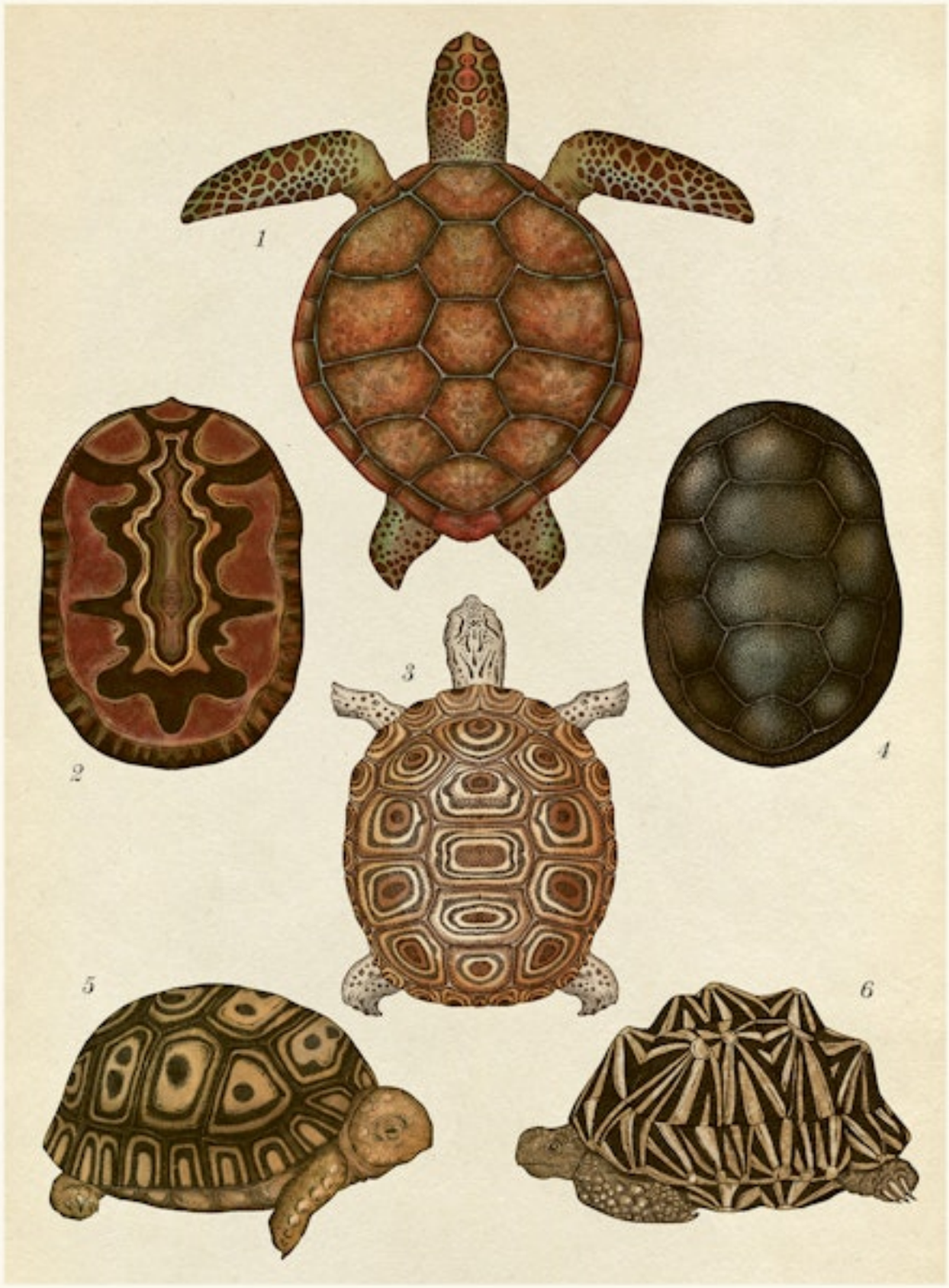
2: **Painted turtle**
Length: 25cm
Also known as the firebelly turtle, it spends long hours basking in the sun. Several painted turtles often pile on top of one another on a log.

3: **Diamondback terrapin**
Length: 15cm
This terrapin nearly became extinct due to over-hunting and destruction of its habitat.

4: **Blanding's turtle**
Length: 20cm
An omnivore, this turtle feeds on berries, fish and frogs.

5: **Leopard tortoise**
Length: 50cm
The leopard tortoise is a large tortoise found in savannah habitats in Africa, where it can live for up to 100 years.

6: **Indian star tortoise**
Length: 28cm
The Indian star tortoise can be found in places that experience monsoon seasons. Its dome shape means it can easily right itself when upside down.



Snakes

Snakes have long, tube-like bodies and no limbs. Because of their body shape, their paired organs, such as kidneys, are stacked one in front of the other rather than side by side, and most have just one lung.

Snakes have large, flexible jaws, which allow them to eat prey much larger than their own heads. Their teeth are designed for killing, but not chewing, so they swallow their victims whole!

Snakes have different methods of attack; around one in ten species has a deadly bite, delivered with poisonous fangs, while others coil their bodies around their victims and crush them to death.

Key to plate

1: **Arizona coral snake**
Length: 50cm
The colourful bands warn others that this snake is venomous.

2: **Paradise tree snake**
Length: 1.2m
This snake is an excellent climber.

3: **Blood python**
Length: 1.5m
A non-venomous python.

Crocodiles and Alligators

As a group, crocodiles and alligators are called crocodilians. They emerged around 140 million years ago, mainly because their ancestors survived whereas the dinosaurs did not. These ancestors were fearsome beasts twice the length of today's crocodilians.

A modern crocodilian still has the same body shape and large, fearsome jaws. They are good swimmers and will hunt any kind of animal, on land or in water. Because their jaws are designed to tear meat apart (rather than chew it), they will clamp large prey, such as a wildebeest, in their jaws. They will then perform the 'death roll', spinning their prey underwater.

Crocodilians are sociable and can often be found in groups on riverbanks or in freshwater lakes communicating with one another. They have excellent senses, including night vision. Their eyes, ears and nostrils are situated on the very top of their heads so they can submerge themselves in water and wait for prey. Their ears are so sensitive that they can hear calls from their unborn young still inside their eggs.

Key to plate

1: **Nile crocodile**
Length: 5m
The Nile crocodile is the second-largest reptile on Earth. Mainly nocturnal, this crocodile can sometimes be found escaping the extreme heat of the midday sun in underground burrows. As with other crocodilians, over time it has developed great flexibility in its hip and ankle joints allowing it to move well on land.

a: Skull
b: Shoulder bone
c: Humerus
d: Carpus and ulna
e: Ribs
f: Fibula and tibia
g: Femur
h: Caudal vertebra

Habitat: Deserts

Very little rain falls in deserts so very few plants are able to grow. Some deserts are cold and mountainous, but the largest deserts in the world are in areas where the sun is extremely hot, such as the Sahara Desert in Africa. But even in scorching hot deserts, the temperatures can plummet at night, meaning that animals living in these habitats must cope with extreme temperatures.

The high and low temperatures mean that rocks weather quickly, breaking down into fine sands. There is little vegetation to hold the ground together, so the sands are easily blown around, forming sand dunes and therefore a constantly changing landscape.

Reptiles are able to live in these environments because they need very little water to survive. Many lizards gape their mouths open when basking in the hot sun to release heat. They take shelter beneath a rock during the hottest parts of the day and hunt in the evening when the sun begins to set and the sands hold enough heat to keep them warm.

Key to plate

1: **Desert kingsnake**
Length: 1.2m
When threatened, this snake will flip on its back and play dead.

2: **Baja California collared lizard**
Body length: 9cm
This lizard can stand on its hind legs when running.

3: **Black-tailed rattlesnake**
Length: 97cm
Named for the warning sound it makes by shaking its tail.

4: **Western banded gecko**
Body length: 10cm

Gallery 5

Birds

Birds

Early birds evolved from tree-dwelling dinosaurs around 150 million years ago and survived the mass extinction that killed the dinosaurs. Learning to fly was a key evolutionary step for most birds, and scientists still aren't sure how or why they first took to the skies. Nevertheless, it meant they spread to every continent, habitat and island on Earth.

All birds are warm-blooded, with two legs, two wings that evolved from the reptile's forelimbs, feathers, beaks and a lightweight skeleton. Birds lay hard-shelled eggs, like reptiles, and hatch chicks.

Linking modern birds back to reptiles is the Palaeognathae – a group of mainly flightless birds that includes the ostrich. The name Palaeognath comes from the Greek term for 'old jaws' referring to their reptile-like mouths. Their bare, scaly legs also add to their prehistoric appearance.

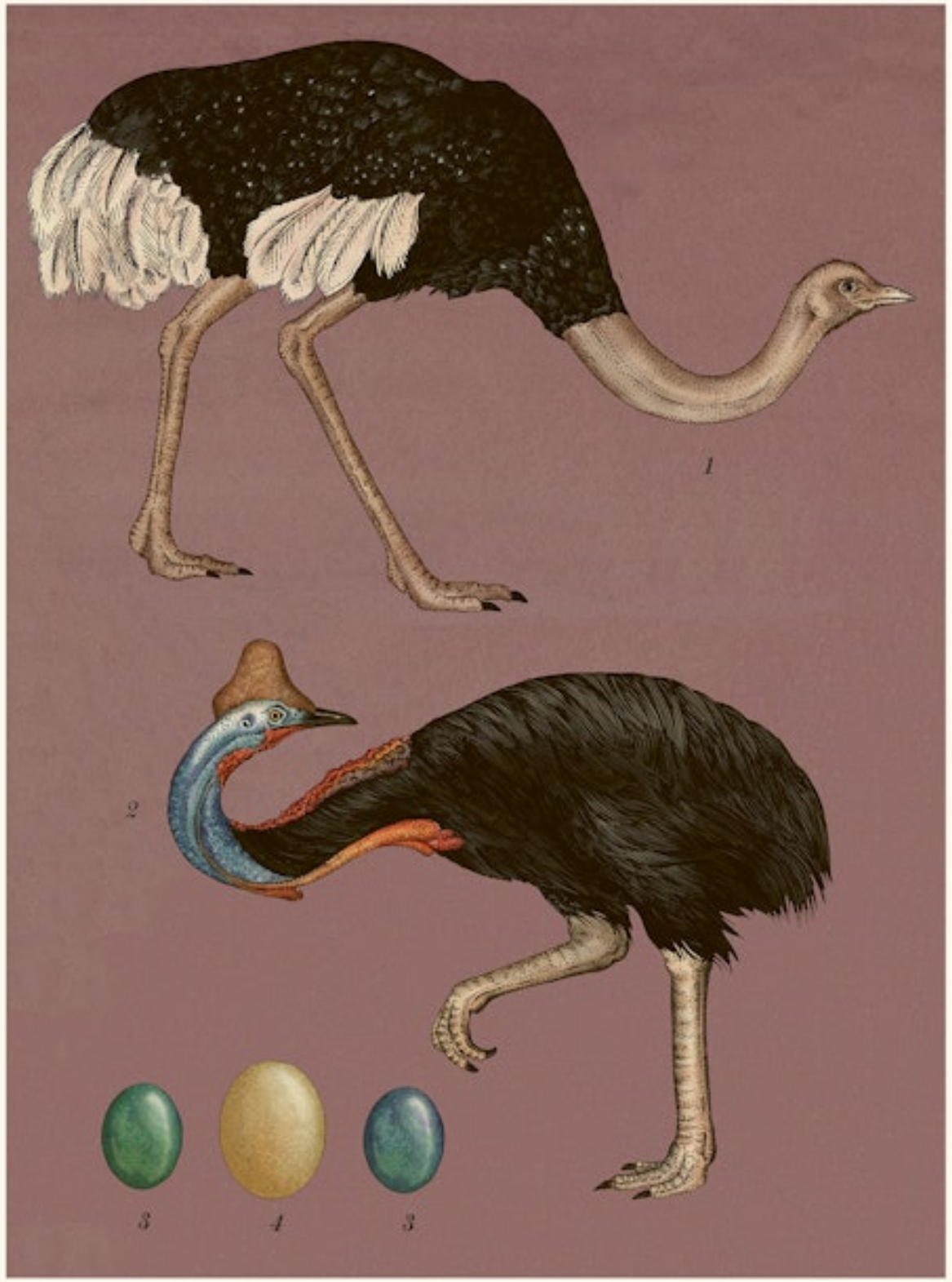
Key to plate

1: **Common ostrich**
Length: 2.4m
The largest and fastest-running bird on Earth. It can reach speeds of up to 70 kilometres per hour thanks to its powerful legs. Ostriches have been known to kill lions with their kick!

2: **Southern cassowary**
Height: 1.7m
The cassowary has a distinctive horn-like casque on its head. Also called a helmet, it develops when the bird is one or two years old. It has a dagger-like claw on its inner toe, which it uses as a spear to defend itself.

3: **Cassowary eggs**
Length: 13.8cm
Females lay three to eight eggs at a time, ranging in colour from bright green to pale green-blue.

4: **Ostrich egg**
Length: 15cm
The largest egg of any bird.



Penguins

The ever popular penguin is found in coastal areas in the Southern Hemisphere. While easy to spot on land, their colouring camouflages them in water: their black backs match the ocean's darkness from above, and their white bellies blend in with the brightness of the sun and ice from below. This type of camouflage is known as countershading.

Penguins don't use their wings for flight; instead, they are excellent swimmers. They have large, webbed feet and wings that act like flippers in the water.

Most species of penguin can survive in cold and harsh environments. They have lots of waterproof feathers which provide excellent insulation, and a special kind of blood flow which means they don't freeze when standing on ice. Raising young in these conditions is tough, however, so penguins lay a single egg, warming it under their plumage and keeping it off the ice by balancing it on their feet. All penguins are attentive parents and take it in turns to catch fish and feed their young once hatched.

Key to plate

1: **Emperor penguin**
Height: 1.1m
The emperor penguin lives in Antarctica. It chooses to breed in winter when there are fewer predators, but this means conditions are tough. The penguins walk distances of up to 80 kilometres inland, where the female lays her egg. She transfers it to her male partner, who incubates it in his brood pouch, balancing it on his feet. The female then departs, leaving the male to protect the egg from fierce winds and temperatures as low as -40°C. He survives on stored body fat alone. Once the chick has hatched, the female returns with food and the male heads back to the sea to feed. By this time, he will have fasted for more than three months!

Flamingos, Storks, Ibises and Herons

These birds live in wetlands all around the world. Their long legs and necks mean they can feed in both deep and shallow water without getting wet.

Flamingos are very sociable creatures. They live together in enormous flocks and often raise their young together in crèches. Their distinctive colouring is a result of their diet of shrimp and means flamingos can range in colour from off-white to a bright coral pink. Usually, the healthier the animal, the brighter it is.

Related to flamingos are storks, herons and ibises. Herons in particular are excellent fishers: standing still and silent as they wait for prey. They have lightning-fast reactions and employ their S-shaped neck and sharp bill to spear fish with impressive speed.

Key to plate

1: **Grey-winged trumpeter**
Height: 52cm
Named for its loud honking call.

2: **American flamingo**
Height: 1.1m
This flamingo buries its head to feed, sucking and filtering mud with its beak.

3: **Northern gannet**
Height: 91cm
This bird dives into water from heights of up to 40 metres to catch fish.

4: **Brown booby**
Height: 74cm
This seabird tracks tuna from the sky and catches the small fish that flee to the surface.

5: **Western reef heron**
Height: 65cm
During courtship, this heron's dark legs turn pinkish red.

6: **Black-crowned night heron**
Height: 62cm
This nocturnal hunter is the most common heron in the world.

7: **Grey crowned crane**
Height: 1m
This crane lives in dry African savannahs but returns to water during the breeding season.

8: **Goliath heron**
Height: 1.5m
The largest and tallest species of heron on Earth.

Birds of Prey

Birds of prey are also known as raptors, and most are fearsome hunters. Many are at the top of the food chain, meaning they have no predators of their own. Some, such as the bald eagle, are so fearsome that they will hunt mammals larger than themselves, like small deer. Others, such as vultures, are scavengers and eat the flesh of animals that are already dead rather than hunting live prey.

Birds of prey have sharp beaks for tearing apart flesh, and strong feet with long talons for snatching their prey from the air. They live long lives with some reaching an amazing 50 years of age.

They are fast and efficient flyers. The peregrine falcon reaches the fastest speed of any living creature on Earth – it dives towards its target at speeds of up to 389 kilometres per hour!

Key to plate

1: **Secretary bird**
Wingspan: 2.1m
One of the only birds of prey known to chase its prey down on foot! When attacking snakes, it uses its wings to protect itself from a venomous bite.

2: **African harrier-hawk**
Wingspan: 1.6m
This bird mostly hunts in trees and bushes and doesn't often fly. It is good at climbing and uses its wings to raid other birds' nests.

3: **Ornate hawk-eagle**
Wingspan: 1.3m
This eagle hunts other birds, reptiles and mammals, and even attacks primates!

4: **Crested caracara**
Wingspan: 1.2m
This bird isn't a great flier so tends to scavenge for food and feed on carrion.

5: **Bateleur**
Wingspan: 1.7m
The bateleur has a unique style of flying; it rocks its wing from side to side as it glides, as though trying to balance. The skin on the bateleur's face and legs flushes bright red when it is agitated.

Exotic Birds

Birds in tropical and exotic environments, such as the bird-of-paradise, tend to have bright, colourful plumage which they use to attract mates.

Other species of exotic birds, such as parrots, are considered particularly intelligent, and have been known to use tools to access food that is out of reach. They are social creatures and many parrots form strong bonds with each other.

Hummingbirds are some of the smallest birds in the animal kingdom, measuring less than 13 centimetres long. They are, however, expert flyers and are the only birds able to fly backwards. Hummingbirds are also able to hover in one spot to extract nectar from flowers. They do this by flapping their wings up to 80 times a second, creating a 'hum'.

Toucans are known for their large and colourful bills. These bills aren't just decorative; they are used to reach lots of fruits in a tree without needing to fly to a different branch. The serrated edges of the bill also means toucans can peel fruit and crack eggs.

Key to plate

1: **Ruby-throated hummingbird**
Length: 9cm
Hummingbirds feed on nectar but they raise their young on insects.

2: **Greater bird-of-paradise**
Length: 43cm

3: **Ruby-topaz hummingbird**
Length: 8cm

4: **Rose-ringed parakeet**
Length: 40cm

5: **Rosy-faced lovebird**
Length: 18cm

6: **Mallee ringneck parrot**
Length: 33cm
The mallee can live for more than 15 years!

7: **Red-breasted toucan**
Length: 43cm
The smallest of the toucan family.

8: **Galah**
Length: 35cm
A common cockatoo from Australia.

Owls

There are two types of owl: typical owls and barn owls. Both have evolved to hunt in the dark and have large eyes that allow them to see well in poor light. Owls are masters of the surprise attack – their feathers are camouflaged to blend in perfectly with their surroundings and muffle the sound of their wings, making them near-silent flyers.

Owls have eyes that are located at the front of their head, giving them two overlapping fields of vision. The unusual size and shape of their eyes, however, mean that owls cannot move their eyes in their sockets, like humans do. As a result, owls have developed flexible necks and are able to turn their heads to change their view. Some can rotate their heads up to 270 degrees!

Key to plate

1: Barn owl
Wingspan: 1m
The most common of all species of owl, the barn owl can be found on every continent except Antarctica. It has excellent night vision and directional hearing, which means it can detect animals hidden underground or beneath snow – very handy for winter hunting.

2: Spectacled owl
Wingspan: 84cm
Found in the rainforests of Central and South America, the spectacled owl isn't very sociable. It roosts alone in a tree by day and hunts at night when it makes a distinctive knocking or tapping noise. The female makes a high-pitched scream which has been compared to a steam engine!

3: Southern white-faced owl
Wingspan: 68cm
Rarely seen, this owl has been nicknamed the 'transformer owl' because of its ability to change when under threat. Depending on the size of its opponent it can either puff up its feathers and make itself bigger, or it can flatten its feathers, hide behind its wing and squint its eyes so it is camouflaged against a tree.

Habitat: Woodlands

Woodland habitats are made up of trees, shrubs and grasses. And lots of plants in a habitat means lots of animals…

Some woodlands are deciduous, meaning that the trees change with the seasons, shedding their leaves in the winter and growing new foliage in the spring. Others are evergreen, keeping their leaves (or 'needles') all year.

Many species of bird live in woodlands including some of the world's best-known songbirds. Although they can be difficult to spot, you can tell them apart by their unique songs. Birds sing for lots of reasons: to claim territory, attract a mate or warn others of danger.

In areas where the woodland is deciduous, many species take part in an annual migration. They live and breed among green trees during the summer, then, when the weather turns colder, they fly thousands of kilometres south to find food and warmer weather. This is a dangerous and exhausting journey, so most birds travel in large flocks for safety.

Key to plate

1: **Stock dove**
Length: 33cm

2: **Eurasian blackbird**
Length: 24cm

3: **Eurasian nuthatch**
Length: 15cm

4: **House sparrow**
Length: 16cm

5: **European starling**
Length: 22cm

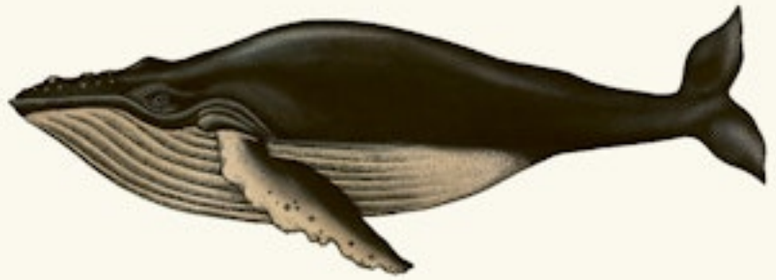
6: **Song thrush**
Length: 23cm

7: **Blue tit**
Length: 12cm

ANIMALIUM

Gallery 6

Mammals



Mammals

Elephants

Primates

Rodents

Bats

Cats

Hoofed Mammals

Water-based Mammals

Habitat: Arctic Tundra

Mammals

Monotromes such as the duck-billed platypus are egg-laying mammals who evolved from reptiles. They eventually evolved into mammals, the most recent animals to appear on Earth.

Mammals have hair or fur and are warm-blooded, which allows them to maintain a constant body temperature in any climate. They give birth to live young, which they feed with their own milk. Most have four limbs, a tail and a relatively large brain. Developing high levels of intelligence takes time and experience, so mammals rely on their parents as they grow.

Marsupials are pouched mammals. Their young are born at an earlier developmental stage than other mammals, so they are carried in the mother's protective pouch while they continue growing. As mammals were evolving, Earth's landmasses were gradually forming the continents we know today. Marsupials were originally found in South America around 50 million years ago, but they travelled to Antarctica by land and then to Australia over the short stretch of water. Australia eventually became an isolated island, which is why its mammals are so unique.

Key to plate

1: **Red kangaroo**
Length without tail: 1.2m
The kangaroo has a tail that is strong enough to support its entire body weight.

2: **Striped possum**
Length without tail: 26cm
A long fourth claw allows this possum to search for grubs and termites.

3: **Common spotted cuscus**
Length without tail: 40cm
This shy nocturnal creature lives in the the trees of the tropical rainforests of Australasia.

4: **Sugar glider**
Length without tail: 18cm
This possum uses the mebrane that stretches from its wrist to its ankle to glide from tree to tree.

5: **Koala**
Length: 74cm
This creature spends most of its life in the trees away from predators. A koala's diet of eucalyptus leaves is so lacking in nutrients that it spends much of its day sleeping in order to save energy.

Elephants

Elephants were once part of a much larger family that also included mammoths. Only two species of elephant remain, and they are now also in danger because of ivory poaching and the destruction of their habitats.

Elephants are instantly recognisable thanks to their trunks, which they use to grab and hold objects. It is thought that millions of years ago they lived mainly in water, using their trunks as snorkels. Even today, they remain strong swimmers.

Overheating is a problem for elephants, as they can't sweat. If an elephant begins to overheat, blood travels to its ears. They flap their ears to cool the blood, which then circulates back through its body, keeping the elephant's temperature down.

Elephants are now the largest animals living on land. Despite their size and weight, they are surprisingly quiet when walking thanks to shock-absorbing tissues in their feet.

Key to plate

1a: **Asiatic elephant**
Height: 2.6m
The Asian elephant has smaller ears and smaller tusks (if it has any at all) than its African cousin's. A female elephant is able to breed at around 14 years of age, and she is pregnant for around 22 months.

1b: **Asiatic elephant calf**
Height: 1m
The newborn is dependent on its mother for up to 48 months and is known as a calf until it is around four years old.

Primates

Primates are made up of two groups: the mostly nocturnal Strepsirrhini, which includes lemurs, lorises and bushbabies, and the Haplorhini, which includes apes, monkeys and *Homo sapiens* (human beings).

Primates typically have four limbs, each with five digits, and most have a tail, providing extra stability in the treetops. Their forward-facing eyes help them to judge distances when swinging from branch to branch and, unlike most other animals, primates can see a large spectrum of colour. They have large brains, which make them highly intelligent and sociable.

About 2.3 million years ago, primates began to stand and walk on two feet. Clearly intelligent, they could use tools and create fire. Modern humans evolved around 200,000 years ago, which makes us one of the youngest and newest species on Earth.

Key to plate

1: **De Brazza's monkey**
Length: 62cm
This monkey has large, robust feet that means it is able to roam the forest floor. It is very sociable.

2: **Golden lion tamarin**
Length: 33cm
Living mainly in trees, this tamarin eats flowers, nectar and eggs. It is known to share its food and care for the young of other tamarins.

3: **Mantled guereza**
Length: 58cm
The mantled guereza lives in groups of up to 15. It spends most of its time in the branches of trees but comes down to the forest floor to feed.

4: **Mandrill**
Length: 80cm
The playful mandrill is one of the largest species of monkey in the world.

5: **Common chimpanzee**
Length: 1.4m
The highly intelligent chimpanzee is one of our closest relatives. It lives in groups of up to 150.

6: **Black-crested mangabey**
Length: 55cm
This monkey has a distinctive 'whoop-gobble' call which it uses to defend its territory. Deforestation means it is under threat.

Rodents

Rodents can be found in vast numbers all around the world and have flourished in very different environments. Including rats, mice, squirrels, hamsters, porcupines and beavers amongst their ranks, rodents make up around 40 per cent of all mammal species.

Some rodents, such as mice, breed a lot, which partly explains why there are so many of them on Earth! They give birth to multiple live young and have to wait only a short period of time for their young to become independent before they are able to mate again. It is therefore possible for one mouse to give birth to over 100 young in a single year!

All rodents have sharp front teeth that never stop growing. They need to frequently gnaw on things to stop their teeth growing too long.

Key to plate

1: **Long-eared jerboa**
Length without tail: 8cm
Native to the Gobi Desert, this rodent performs high leaps to catch insects.

2: **Northern Luzon giant cloud rat**
Length without tail: 40cm
This rat is from the Philippines and lives in the treetops.

3: **Lowland paca**
Length without tail: 70cm

4: **Prevost's squirrel**
Length without tail: 24cm

Bats

Bats are the only mammals that can fly and they do it very well. They have four long fingers and a thumb, each being attached to the next by a thin layer of skin which forms wings, allowing them to fly quickly and accurately through the air.

Bats are mostly nocturnal creatures, so they sleep during the day, often wrapping their wings around themselves for warmth. They come out to hunt at twilight when there is less competition for food. They eat a variety of things, including insects, and – in the case of the vampire bat – they even suck blood from large mammals!

Bats use echolocation to find their prey in total darkness, a skill they share with dolphins and whales. They build a detailed picture of their surroundings by sending out high-pitched sound pulses. From the time that noise takes to echo back, they can work out what is nearby. Raindrops interfere with the sound pulses, however, so bats do not come out to hunt when its raining.

Key to plate

1: **Indian flying fox**
Wingspan: 1.4m
This nocturnal bat rests in trees with several hundered fellow bats. How high a male sits in a tree indicates its status within the group.

2: **Brown long-eared bat**
Wingspan: 24cm
This bat's ears match its body in size, giving it an excellent sense of hearing.

3: **Seba's short-tailed bat**
Wingspan: 30cm
This bat eats several types of fruit and is an important spreader of seeds, dispersing up to 2,500 per night in its droppings!

4: **Diadem roundleaf bat**
Wingspan: 50cm
A leaf-nosed bat, the Diadem roundleaf roosts in caves and hollow trees and hunts by hanging from a perch and snatching large insects.

5: **Yellow-winged bat**
Wingspan: 36cm
Known as one of the false vampire bats, the yellow-winged bat was originally thought to feed on blood. Living in the savannah and woodlands of central Africa, it actually just eats insects.

Cats

While modern cats can be found in rainforests and mountains, many of the best-known big cats, such as lions and cheetahs, live in open grasslands. They are famous for their cunning and speed. The fastest creature on land is the cheetah – it can reach speeds of up to 104 kilometres per hour.

Cats have good eyesight. Their ears and sense of smell are sensitive, and their whiskers pick up sensory information to help them hunt at dusk. Many cats have coats that are camouflaged with spots or stripes to blend into the light and shadows of their surroundings.

When stalking prey, cats crouch low and move forward slowly. At the last moment, in a flash of speed, they run at their victim and snatch it with their strong claws and sharp teeth.

Domestic cats are descended from wild cats and appeared around 10,000 years ago. They are still capable of hunting, catching millions of birds and small mammals every year.

Key to plate

1: **Clouded leopard**
Length: 89cm
This rarely seen species is excellent at climbing. It is under threat due to the deforestation (at the fastest rate on Earth) of its habitat in South-East Asia.

2: **Lion**
Length: 2.85m
Immediately recognisable due to its impressive mane, and second only to the tiger in size, the lion lives in prides where the females hunt together for food.

Hoofed Mammals

There are a huge range of hoofed mammals, from the powerful rhinoceros to the elegant gazelle. Despite differences in appearance, hoofed mammals all have toes strengthened by a thick covering similar to toenails, which never stops growing and is worn down by constant use.

Many have horns or antlers made of bone which they use to defend themselves. Some species, such as deer, will demonstrate their strength by locking horns with a rival, hoping to impress a female and win the right to mate with her.

Hoofed mammals are usually grazing herbivores, which means they eat shoots and leaves. They have wide, flat teeth and 'chew the cud', bringing up partly digested food into their mouths, which they chew further and then swallow again.

Some of these mammals, such as wildebeests and bison, migrate thousands of miles every year to find new grazing pastures when the weather changes and food becomes hard to find.

Key to plate

1: **Hippopotamus**
Height: 1.5m
The name hippopotamus derives from the Greek for 'river horse'. It wallows in the water by day and grazes on grassy pastures at night.

2: **Indian rhinoceros**
Height: 1.85m
Smaller than the white rhinoceros, the Indian rhino has a smaller horn and heavy folds of skin with wart-like bumps on its behind.

3: **Reeve's muntjac**
Height: 43cm
This small and stocky deer is originally from China but now thrives in the forests of Europe. It has short antlers which can regrow if damaged, and prominent canine teeth.

4: **Gerenuk**
Height: 92cm
The East African gerenuk has long legs and a long neck and can reach leaves that other species can't.

5: **Masai giraffe**
Height: 5.5m
The African Masai giraffe is the tallest land mammal on Earth. It feeds from the treetops and its long, flexible tongue stretches to gather twigs and leaves.

Water-based Mammals

These mammals include the groups Sirenia (manatees), Pinnipedia (seals) and Cetacea (whales and dolphins). Despite spending most of their lives underwater, these mammals still need to breathe air into their lungs. As a result, they are excellent at holding their breath – the Weddell seal, for example, can last for up to 80 minutes without needing to resurface! Whales and dolphins take air in and push carbon dioxide out through a blowhole located on the top of their heads.

Like bats, water-based mammals locate prey by using echolocation. Water carries sound waves better than air, so some creatures can communicate across long distances. Humpback whales 'sing' to one another and their low-frequency sounds can travel up to 16,000 kilometres.

Key to plate

1: **Humpback whale**
Length: 14m
The humpback whale is often seen breaching the water and slapping its tail.

2: **Amazonian manatee**
Length: 2.4m
Like elephants, the manatee has teeth that are constantly being replaced. It spends much of its day asleep.

3: **Narwhal**
Length: 4.5m
The narwhal has a long, spiralled tusk.

4: **Short-beaked common dolphin**
Length: 1.8m
Dolphins are intelligent and sociable. They live in big groups of hundreds or thousands of dolphins.

5: **Weddell seal**
Length: 3m
This relatively large seal is typically found around the South Pole.

6: **Walrus**
Length: 2.9m
A walrus' tusks can grow as long as one metre! It uses these tusks to dig holes in the ice.

Habitat: Arctic Tundra

Around the North Pole is a cold, barren area called the tundra. Freezing temperatures and high winds makes this one of the toughest habitats on Earth. The ground is permanently frozen, which means there is little for animals to feed on.

Mammals can survive here because they are warm-blooded and have furry coats. The thick coat of some Arctic mammals changes colour throughout the seasons for camouflage, turning white for the snowy winter and a darker colour in summer.

Staying warm in such a cold habitat uses a lot of energy so many mammals living here, such as the Arctic wolf and polar bear, are carnivorous predators, feeding on protein-rich meat.

Polar bears are perfectly adapted to living in this habitat: they are excellent swimmers and their white coat is made up of clear, hollow hairs which keep them warm in the water and dry out quickly when they are back on land.

Key to plate

1: **Polar bear**
Length: 2.15m
The polar bear ventures far and wide in search of food and has been know to travel thousands of kilometres.

2: **Muskox**
Length: 2.1m
The muskox lives in small groups in the summer and then forms large herds in the winter for warmth.

3: **Arctic wolf**
Length: 1.1m
A pack of Arctic wolves works together to hunt and care for any young pups.

4: **Arctic hare**
Length: 56cm
Fast and agile, the arctic hare escapes predators by running at speeds of up to 64 kilometres per hour. It uses its keen sense of smell to find food buried beneath the snow.

Glossary

Adapted The process of change that means an animal is better suited to its environment.

Ancestors A relative who lived a long time ago.

Camouflage Colours or patterns that help an animal to blend in with its surroundings and hide from predators.

Carnivore An animal that eats meat.

Cartilage Tough but flexible tissue found in the body of an animal.

Cold-blooded Having a body temperature that changes according to the environment.

Currents The constant movement of seawater driven by forces such as gravity.

Deforestation The clearing or cutting down of forests.

Endangered A species at risk of becoming extinct.

Erosion The gradual wearing away of land by water, wind and ice.

Evolution The process by which living things change over time.

Exoskeleton An 'outside skeleton' that supports and protects the bodies of some types of animals, especially insects.

Extinct A species of animal or plant than no longer has living members.

Food chain A way to show how living things get their food. Some animals eat plants while some eat other animals. A food chain shows each link in the chain, for example, a giraffe eats leaves and a lion eats the giraffe.

Habitat The places where plants and animals live. A habitat provides the right type of food, water and shelter for the plants and animals that live there.

Herbivore An animal that eats plants.

Insulation A thick layer that stops heat escaping.

Marine Anything that relates to the seas and oceans.

Metamorphosis A dramatic physical change experienced by some animals and insects during their life cycle.

Migration The movement of animals from one region to another at a particular time of year.

Monsoon A change in the direction of strong winds that blow in the Indian Ocean and southern Asia. These seasonal winds cause heavy rainfall.

Nocturnal Awake and active at night, and asleep during the day.

Plumage All the feathers on a bird's body.

Poaching The illegal hunting of animals.

Predator An animal that hunts other animals for food.

Prehistoric The period of history before anything was written down.

Prey An animal that is hunted or killed by another for food.

Savannah A large flat area of land covered with grass. Usually containing very few trees, Savannahs cover half of Africa and large areas of South America, Australia and India.

Spawn Animals that live in water such as fish and amphibians lay their eggs, or 'spawn', in water. This type of reproduction is called 'spawning'.

Species A particular type of plant, animal or other living thing.

Toxin A poison produced by a living thing.

Venomous Able to produce a fluid called venom which is poisonous to animals and humans.

Warm-blooded Having a body temperature that usually remains the same. Warm-blooded animals can make their own heat, even when it is cold outside.

Wetlands An area of land that is covered by water, either permanently or at certain times of the year. Swamps and marshes are examples of wetlands.