

1

TEMPERATE BROADLEAF AND MIXED FOREST
 These forests generally have a mild climate and plenty of rain throughout the year. The trees are mainly deciduous and drop their leaves in the winter, forming a deep layer of litter which supports its own complex web of life. In warmer parts of the zone, trees and plants such as eucalyptus and bamboo form evergreen forests.


Example species (deciduous forest): Fallow deer, badger, woodpecker; oak, beech, maple
 Example species (evergreen forest): Koala, panda; eucalyptus, bamboo



2

POLAR ICE AND TUNDRA
 The Arctic and Antarctic are the coldest places on Earth, with 24-hour daylight in summer and perpetual darkness in winter. There is little vegetation and few animals live on the land. The stormy polar seas, in contrast, are rich in life, from minute plankton to giant whales.

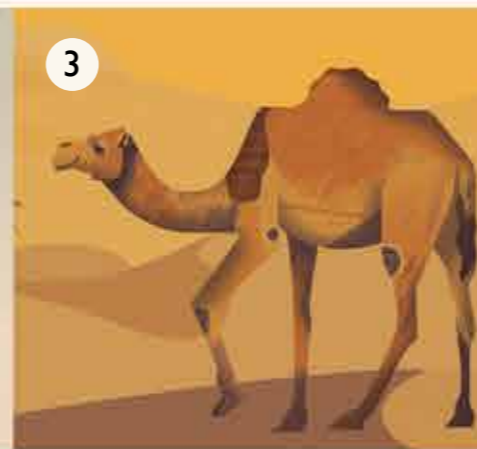
Example species: Polar bear, walrus, blue whale; lichen, moss



3

HOT DESERT
 While deserts can also be cold, scorching heat and lack of rain make hot deserts one of the harshest places to live on Earth. There are few plants but despite this many animals have adapted to live here, conserving water in their bodies and becoming active only at dawn and dusk.

Example species: Camel, jerboa, horned viper; cactus



4

MOUNTAIN
 Mountains cover nearly 25 per cent of the Earth's surface in both warm and cold regions of the world. The animals and plants that live on the higher slopes above the treeline have adapted to harsh conditions: low oxygen, sparse vegetation, low humidity, cold temperatures and often strong winds.

Example species: Eagle, snow leopard, ibex; sedge grass, lichen, moss

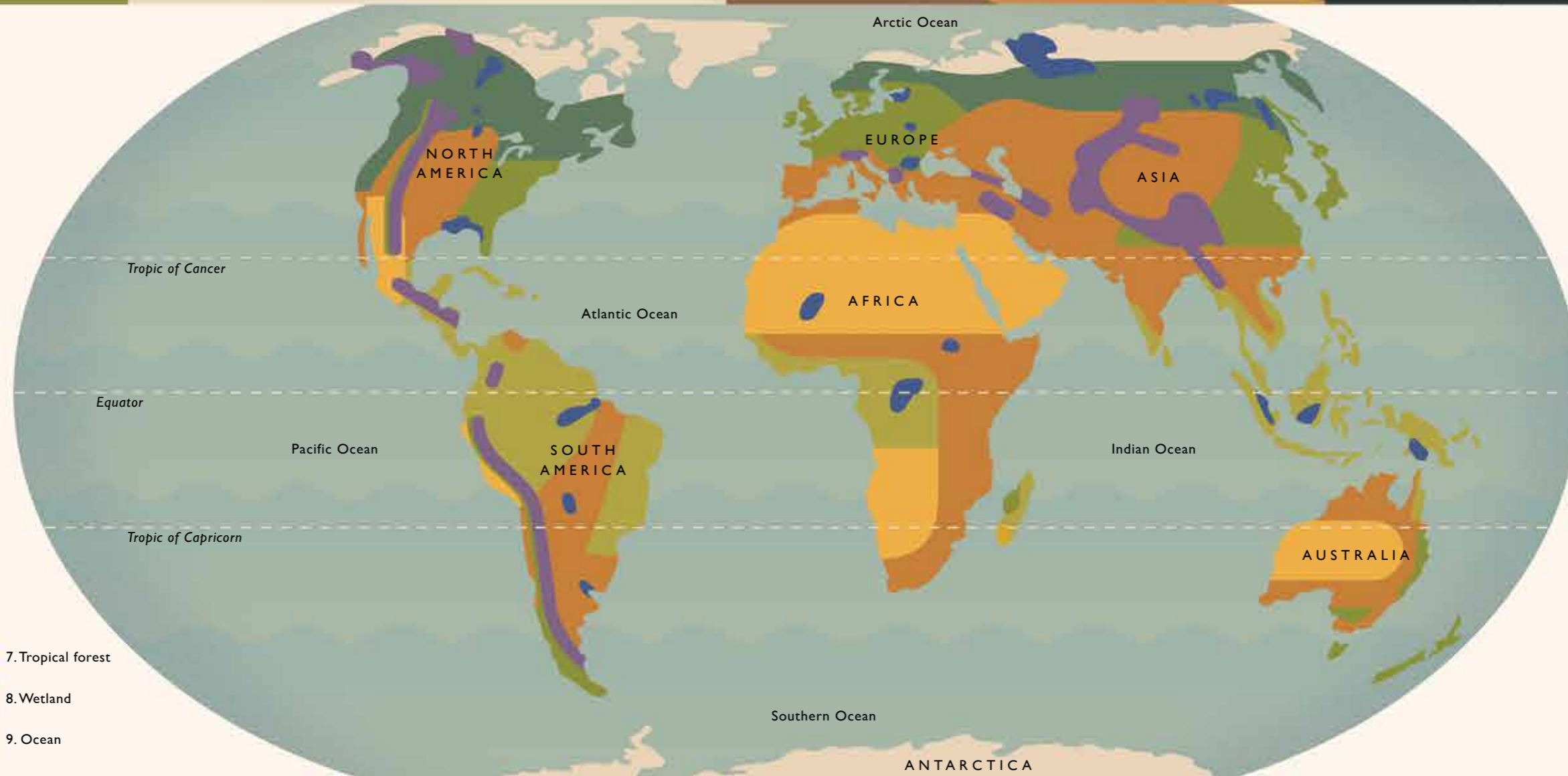


CHART No.5



WORLD HABITATS

THE EARTH HAS A COMPLEX JIGSAW OF HABITATS. This is thanks partly to its great physical variety – from towering mountains to desert plains, mighty rivers to inland seas – but it is also climate that determines the plants and animals that live in any given place. This world map shows nine of the major world habitats. Each supports its own specially adapted community of plants and animals.



- 1. Temperate broadleaf and mixed forest
- 2. Polar ice and tundra
- 3. Hot desert
- 4. Mountain
- 5. Grassland
- 6. Coniferous forest
- 7. Tropical forest
- 8. Wetland
- 9. Ocean

5

GRASSLAND
 Stretching across the wide plains of temperate and tropical regions, grasslands form where it is too dry for many trees to grow. Grasses are the main plant growing there and there is little shelter. In the tropical grasslands of Africa, the savannah, great herds of plant-eaters, such as antelopes and wildebeest, provide food for a great variety of predators, including lions and cheetahs, and scavengers like hyenas and vultures.

The prairies and pampas of the Americas and the steppes of Asia are examples of cooler grasslands.

Example species (tropical): Lion, zebra, elephant, ostrich; grass, acacia
 Example species (temperate): Bison, mongoose; grass, mesquite, saltbush



6

CONIFEROUS FOREST
 Short summers and long, cold winters are the key features of these forests that stretch across the top of North America, Europe and Asia, also known as boreal forests or taiga. Many animals sleep through the winter months here, while others remain active, feeding on food stores made earlier in the year.


Example species: Brown bear, long-eared owl, grey wolf; spruce, pine, larch



7

TROPICAL FOREST
 Near the equator it is always warm and humid, an ideal climate in which plants can grow all year round. The forests that grow here contain the richest variety of life on land; perhaps half of all the different kinds of plant and animal in the world live here.

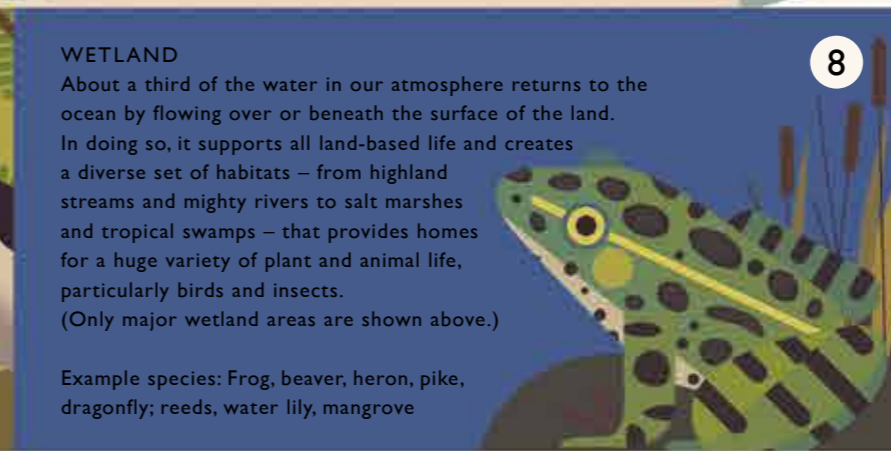
Example species: Toucan, howler monkey, green tree frog; teak, orchid, liana



8

WETLAND
 About a third of the water in our atmosphere returns to the ocean by flowing over or beneath the surface of the land. In doing so, it supports all land-based life and creates a diverse set of habitats – from highland streams and mighty rivers to salt marshes and tropical swamps – that provides homes for a huge variety of plant and animal life, particularly birds and insects. (Only major wetland areas are shown above.)

Example species: Frog, beaver, heron, pike, dragonfly; reeds, water lily, mangrove



9

OCEAN
 Oceans cover 70 per cent of the world's surface and are where life on Earth began. Across a wide range of habitats – from deep ocean trenches to sunlit coral reefs – the oceans support a great number and variety of creatures, but most life here ultimately depends on plankton – the starting point for the great food web of the seas.

Example species: Butterfly fish, dolphin, herring; krill, plankton, kelp



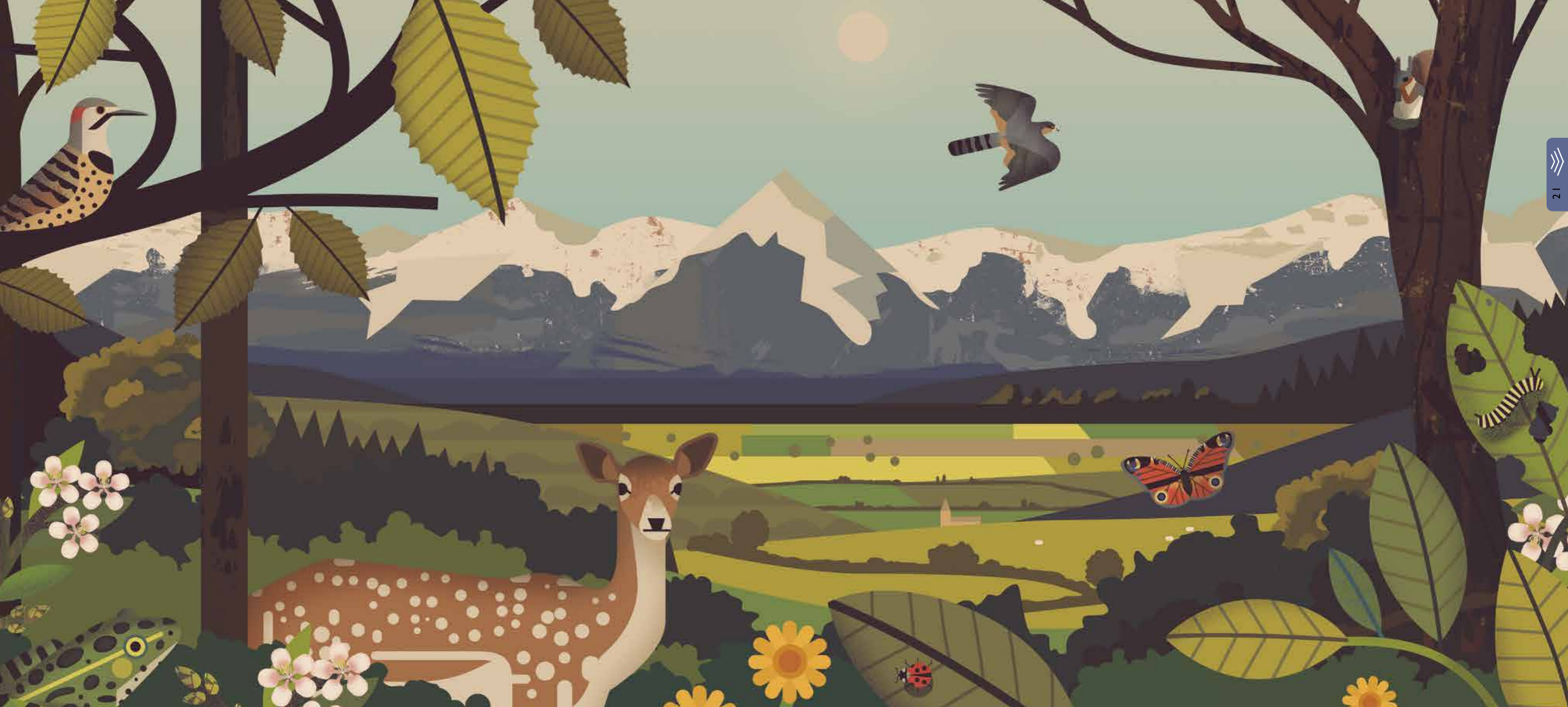


CHART No.6



IN THE NATURAL WORLD EVERYTHING HAS A PURPOSE. The colourful feathers of a male bird of paradise are there to help him attract a mate, the shape of a guillemot's egg is designed to stop it rolling away off the

edge of a cliff, the patterned wings of a butterfly helps it frighten away predators – everywhere you look, living organisms have adapted and evolved, whether in appearance or behaviour, to maximise their chances of survival.

Over many generations these adaptations have come about through small variations that have allowed one living thing to compete better for survival than another. As an example, the giraffes with the longest necks can reach the

most food so are more likely to survive when food is scarce and go on to produce long-necked offspring of their own.

Adaptations that help living things survive can take a number of forms – physical, (such as an animal's shape),

behavioural (such as the ability to use tools) or physiological (such as the ability to make venom). Over time, they can help an animal survive in more challenging environments with little food and harsh climates, such as deserts or mountaintops.

Plants too have adapted to increase their chances of survival, from the cacti's ability to store water, to the myriad ways in which plants spread their seeds. Nowhere can nature's ingenuity be seen more clearly than in the fight to survive.

THE FIGHT FOR SURVIVAL



AMAZING MAMMALS, GREAT AND SMALL

THIS GROUP OF VERTEBRATES CONTAINS SOME OF THE BEST-KNOWN AND MOST STUDIED SPECIES ON EARTH, and is the class to which we humans, *Homo sapiens*, also belong.

- There are over 5,000 species of mammal: a hugely varied and complex collection that includes our largest living land and sea creatures – the African elephant and blue whale respectively.
- The first mammals appeared around 195 million years ago. They evolved from early reptile-like animals and were small, shrew-like creatures.
- Since then, mammals have adapted to live in many of the

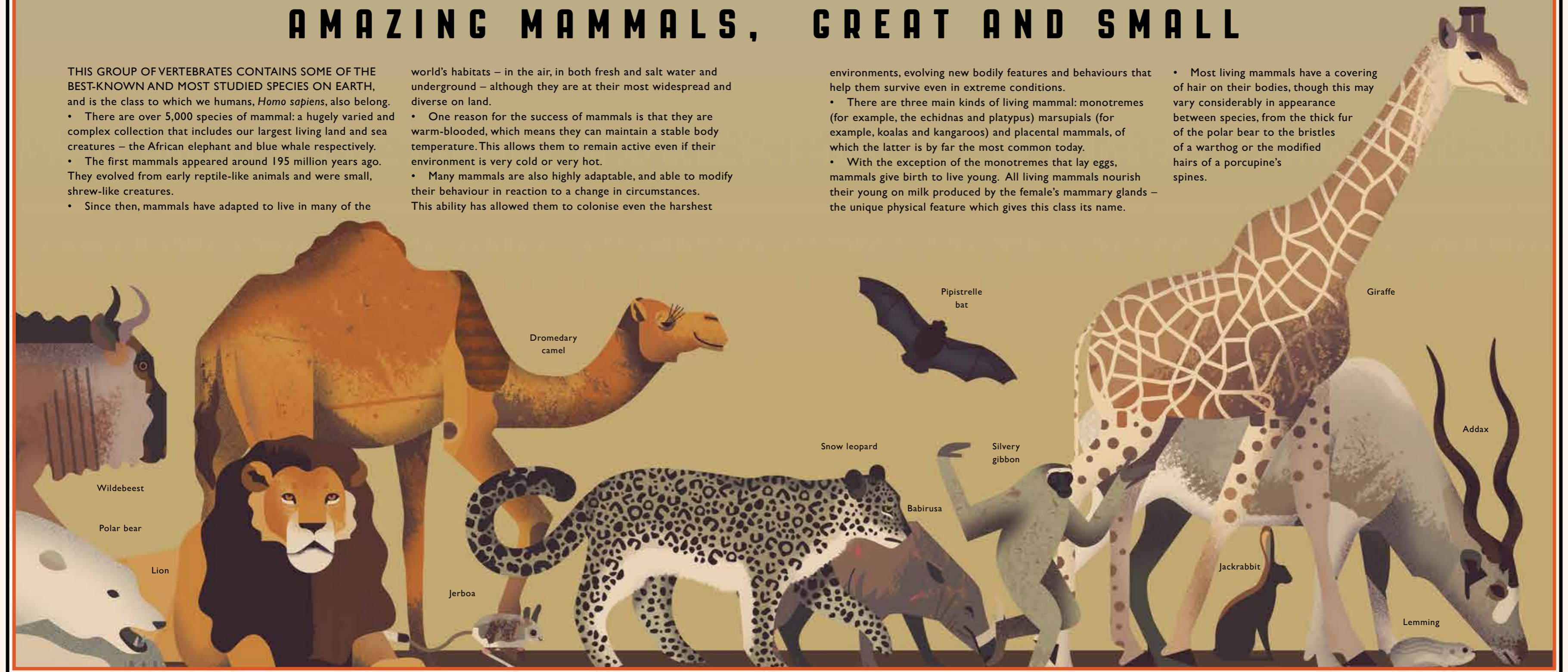
world's habitats – in the air, in both fresh and salt water and underground – although they are at their most widespread and diverse on land.

- One reason for the success of mammals is that they are warm-blooded, which means they can maintain a stable body temperature. This allows them to remain active even if their environment is very cold or very hot.
- Many mammals are also highly adaptable, and able to modify their behaviour in reaction to a change in circumstances. This ability has allowed them to colonise even the harshest

environments, evolving new bodily features and behaviours that help them survive even in extreme conditions.

- There are three main kinds of living mammal: monotremes (for example, the echidnas and platypus) marsupials (for example, koalas and kangaroos) and placental mammals, of which the latter is by far the most common today.
- With the exception of the monotremes that lay eggs, mammals give birth to live young. All living mammals nourish their young on milk produced by the female's mammary glands – the unique physical feature which gives this class its name.

- Most living mammals have a covering of hair on their bodies, though this may vary considerably in appearance between species, from the thick fur of a polar bear to the bristles of a warthog or the modified hairs of a porcupine's spines.





SKELETONS AND SKULLS

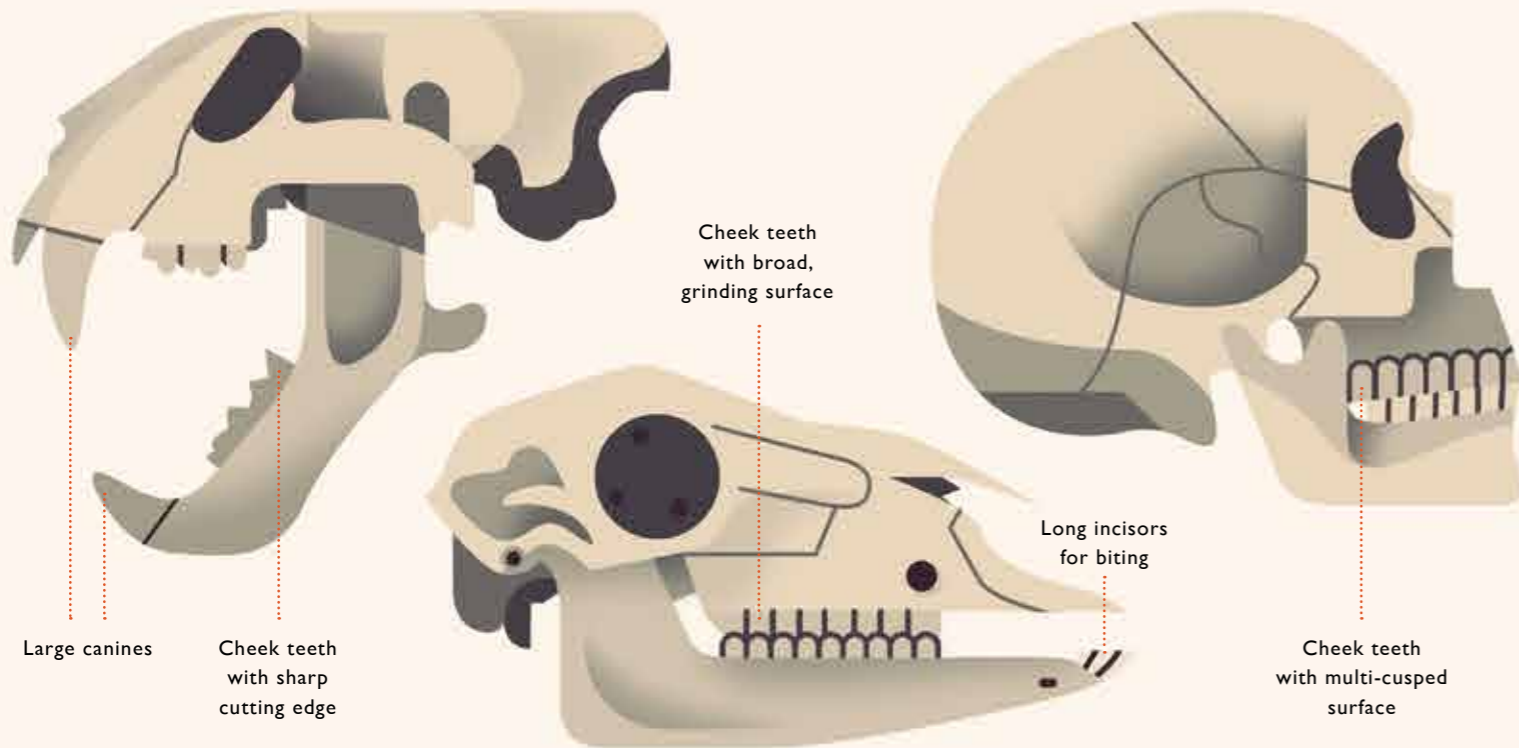
ALL MAMMALS HAVE THE SAME BASIC SKELETON. Although they may look very different, a giraffe has the same number of neck bones as a human being, and a cat – despite being much larger – has a similar bone structure to that of a mouse. Around this bony framework many different body shapes have evolved, reflecting the lifestyle, habitat and diet of each particular species.

SKULLS AND TEETH

The jaws of modern mammals have evolved some important characteristics. Their lower jaw is hinged directly to the rest of the skull and is made from

a single piece of bone. Strong muscles allow for complex movements, and the mouth is equipped with specialised teeth that reflect the animal's diet. All of these things help to make mammals effective eating machines.

- Most mammals have four types of teeth: **incisors** for biting and cutting; **canines** for gripping and tearing; and cheek teeth (**premolars** and **molars**) for crushing and grinding.
- The shape, size and arrangement of these teeth vary according to the food an animal eats. We can often tell a great deal about the lifestyle and behaviour of an extinct creature from nothing more than a handful of its teeth or skull fragments.



CARNIVORE SKULL

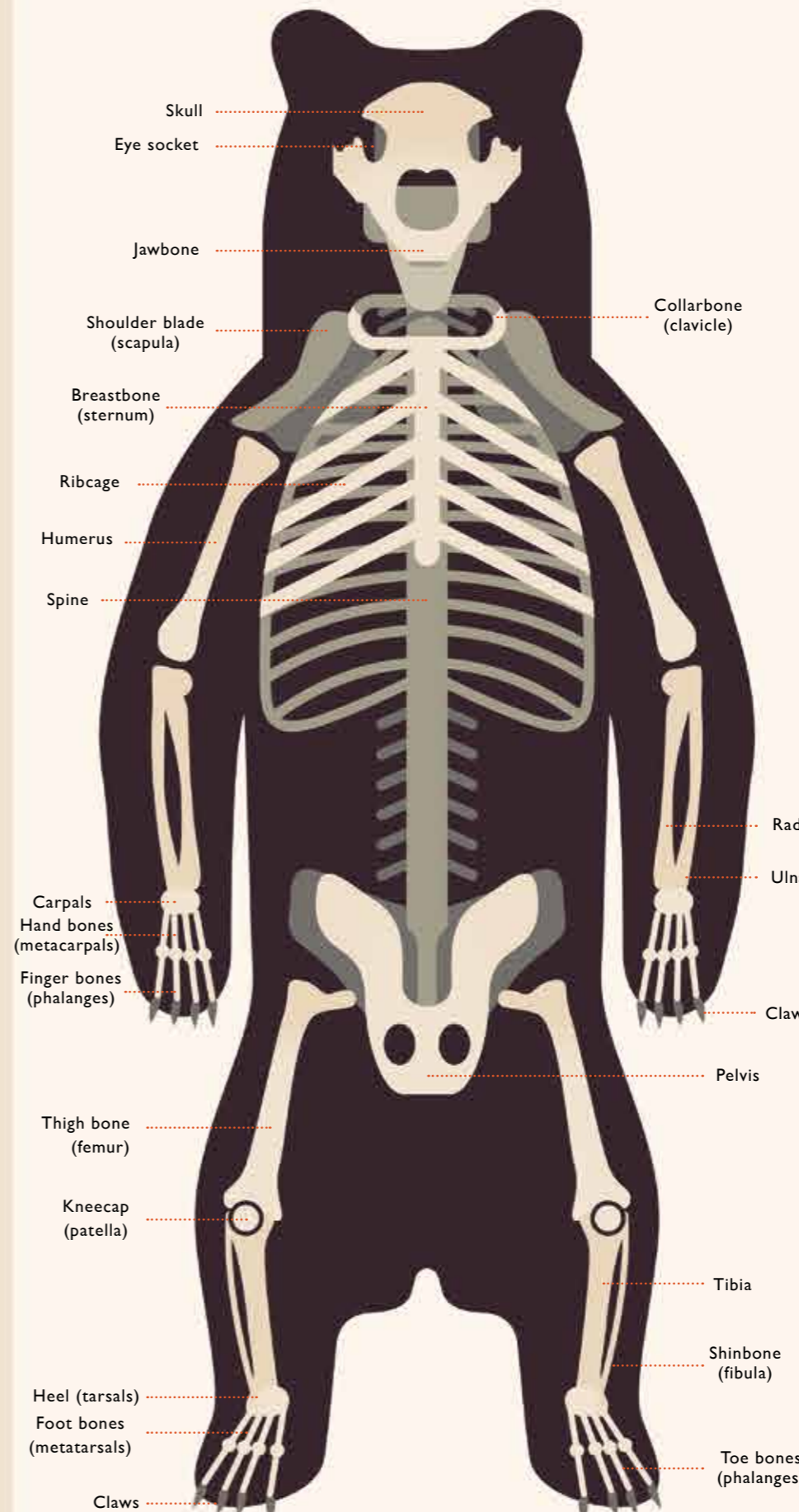
Meat-eaters have teeth shaped for tearing with large canines for ripping and gripping prey, and skulls equipped with powerful jaw muscles capable of biting with great force. They also have sharp-edged cheek teeth used to shred meat and crack open bones.

HERBIVORE SKULL

Plant-eaters have teeth equipped to chew tough vegetation, with jaws that can typically move from side to side as well as up and down to crush food. Most do not have canine teeth, but have long, sharp incisors for snipping off foliage, and broad cheek teeth.

OMNIVORE SKULL

Creatures (including humans) that eat both plants and animals have skulls and teeth suitable for chewing a wide range of foods. Their cheek teeth often have a number of raised points, or cusps, designed to cope with processing a varied diet.



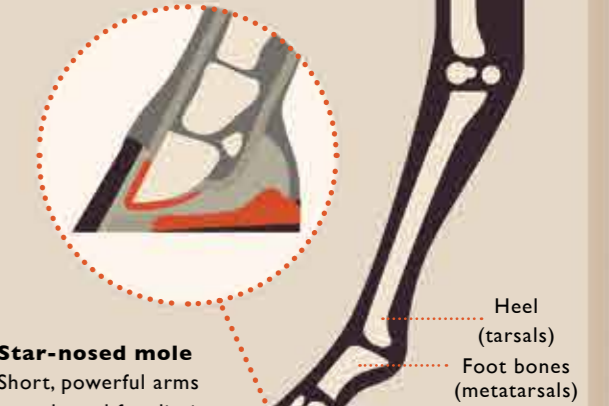
GRIZZLY BEAR SKELETON

MOVING ABOUT

Although most mammals move by walking, running or climbing, some can swim, dig or fly. No matter how they move, their limbs always have the same underlying bone structure, albeit modified to reflect their way of life.

Giraffe

A giraffe's legs are specially adapted for running, with each limb ending in a cloven hoof, formed of thick nail rolled around the tip of the toe.



Star-nosed mole

Short, powerful arms are adapted for digging, and end in sharp claws.



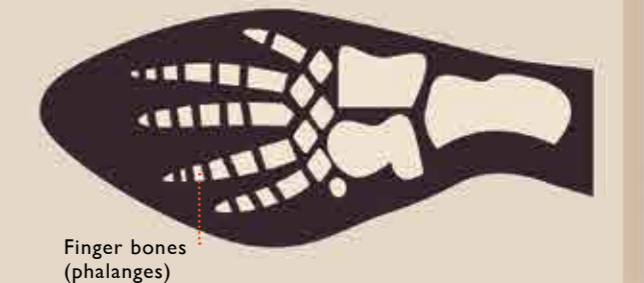
Long-nosed bat

Long finger bones support a membrane of thin skin to enable flight.



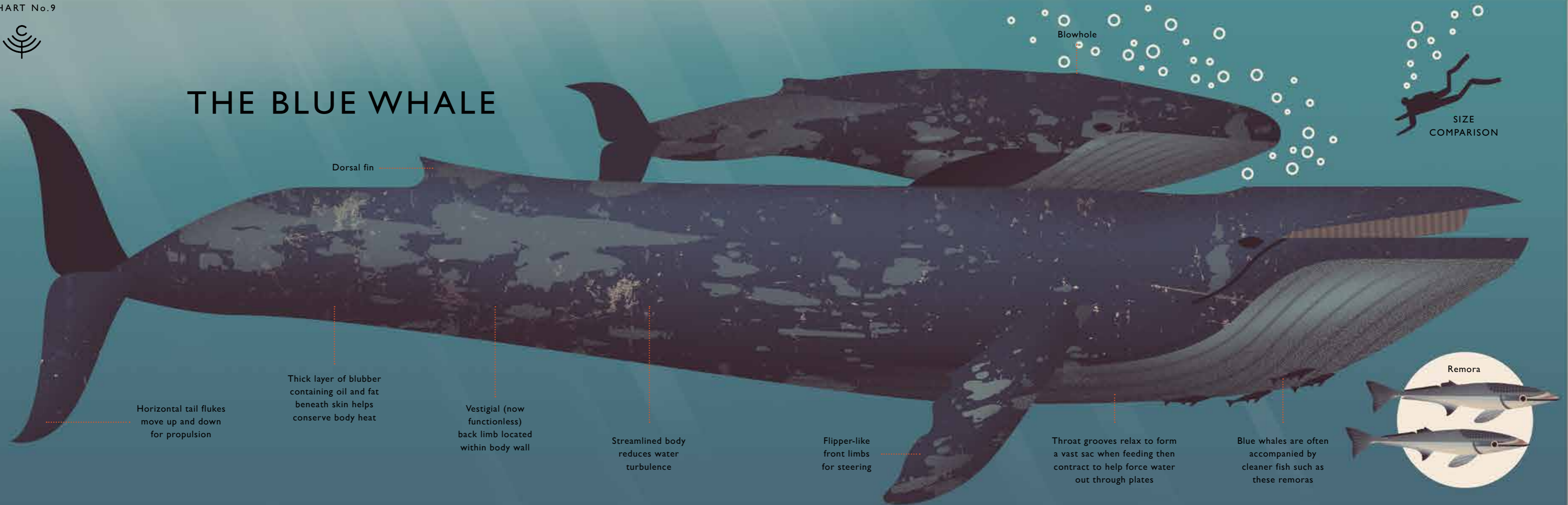
Blue whale

Arms have evolved into specialised rubbery flippers to aid swimming.





THE BLUE WHALE



NOT ONLY IS THE BLUE WHALE THE LARGEST LIVING CREATURE – IT IS THE BIGGEST ANIMAL EVER TO HAVE EXISTED ON EARTH. Despite its superficially fish-like appearance, it belongs to a class of mammals known as **cetaceans** that includes whales, dolphins and porpoises.

- A fully-grown adult whale can reach over 33 metres in length, longer than three double-decker buses.

- It is one of the most specialised of all mammals with its fish-shaped body and flipper-like front limbs, and is an example of a **baleen whale**, named after the hundreds of horny (baleen) plates found on either side of its upper jaw. It uses these to sieve thousands of tiny planktonic crustaceans, such as krill, from seawater.
- Like all true mammals, the blue whale is warm-blooded and it gives birth to a single calf that it then suckles for six to

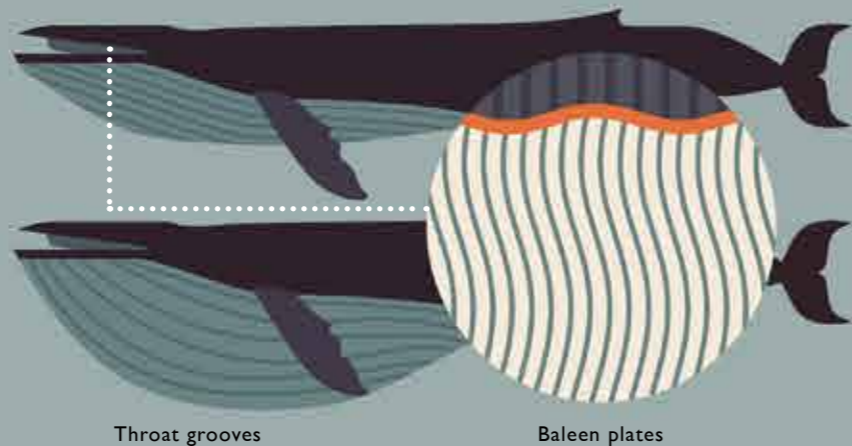
- eight months from teats hidden in a pouch in its body.
- A whale calf may be as long as 7 metres at birth and will drink over 400 litres of its mother's milk every day until it starts to feed for itself.
- A migratory species, blue whales are found in all of the world's oceans. They feed in the Arctic and Antarctic during the summer when krill are plentiful and move to tropical water to breed during the winter.

- They communicate through a series of grunts, moans and hums and can make the loudest sound of any animal, echoing through the ocean at 180 decibels.
- Whales breathe through nostrils known as **blowholes** on the top of their heads. Strong muscles keep these closed when the whale is underwater, opening when the whale surfaces to explosively release air from its lungs before taking another breath.



FEEDING

To feed, the blue whale gulps a huge mouthful of seawater, expanding its lower jaw into a giant bag that can hold more than 90 tonnes of food and water. This food sticks to fine bristles on the baleen plates when the water is expelled. It is estimated that a blue whale can eat as many as 40 million krill in a single day!



TOOTHED WHALES

The remaining members of the cetaceans are the **toothed whales** – the dolphins, orca and porpoises as well as the sperm, white and beaked whales. Toothed whales make up almost 90 per cent of living cetaceans and all possess teeth rather than baleen plates, often housed in a long beak-like snout at the front of the head.