Amazing Animal Adaptations

From a predator's big teeth to the camouflage of their prey, adaptations are features that make animals better suited to where they live and the way they live. You don't have to look far to find some pretty amazing adaptations. Here are some for you to look out for as you follow the **Blue Route** around the Museum.

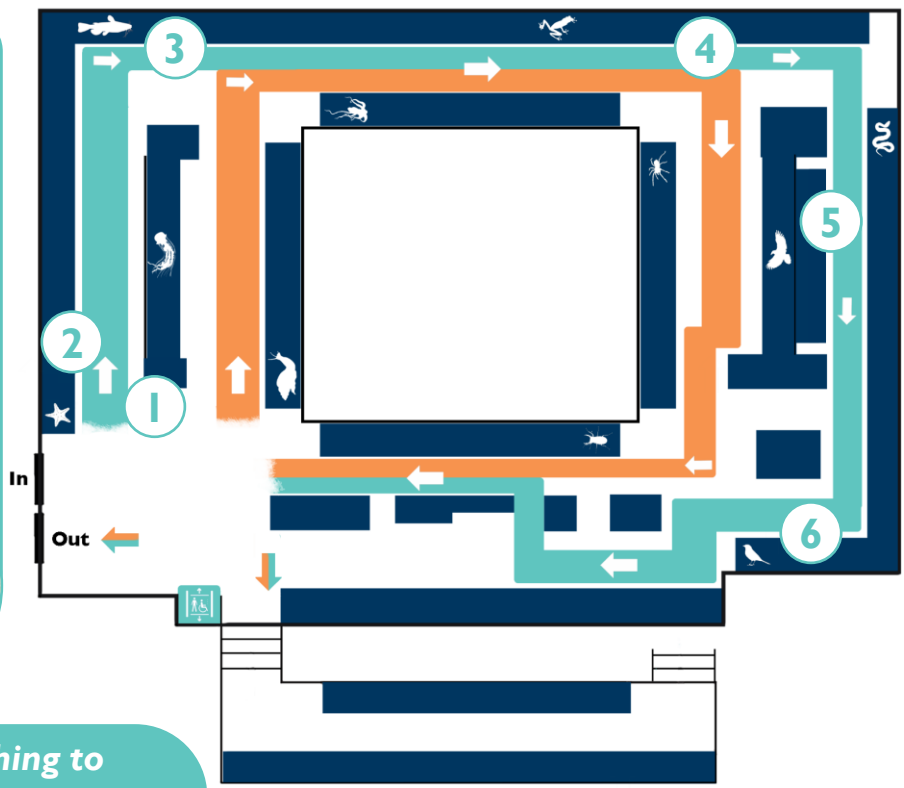
Upper Gallery

3 *How do these fishes defend themselves against predators?*

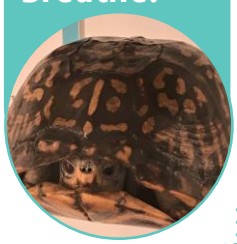


4 *Amphibians have incredible skin. Take the Surinam toad, whose eggs become embedded in the skin on mum's back. Here the baby toads can develop in safety. Can you see any other amazing amphibian skin adaptations?*

2 *You have to look underneath a starfish to see its mouth. How do you think it feeds?*



5 *Did you know: turtle shells are made partly from the ribs. How do you think they breathe?*



1 *Something to think about as you go around the Museum – how many extinct animals do you see? If animals are so well adapted to their environments, why do they die out?*

6 *The lyrebirds of Australia have an extraordinary song – they are able to mimic other birds, animals and even human sounds such as engines, car alarms and camera shutters. What sounds can you mimic?*

Turn over to see the answers...

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1 The dodo lived on the island of Mauritius, where there were no natural predators on the ground and so no need to fly. When Europeans arrived, they not only hunted dodos, but also brought rats and other predators with them. The dodo went extinct less than 100 years later.

2 Starfish are predators. Some feed by pushing the stomach out through the mouth to digest the soft parts of their prey, slurping up the resulting soup. Their relatives the sea urchins are herbivores, and basket stars are filter feeders picking up tiny bits of food out of the water.

Did you know: *when threatened, some sea cucumbers push part of their gut through their bottoms, the sticky strings being dangerous for anything that might want to eat them.*

3 These fish show some amazing adaptations for defense.
Leafy seadragon: the king of camouflage in the ocean, the leafy sea dragon looks just like the seaweed it lives amongst.

Porcupinefish: When threatened this animal inflates its body, pushing its spines out and making it much bigger and harder to eat. Some species are also very poisonous: a fish best avoided!

Flying fish: The front pair of fins in a flying fish are huge and shaped like bird wings. They can escape predators by gliding above the surface of the sea – usually for 50m, but with updrafts from the ocean they can glide for 400m.

4 Here's another amazing amphibian: the hairy frog. Amphibians can breathe through their skin. What looks like a pair of furry trousers are little extensions of the skin that increases the area to breathe across. Another trick this frog has is to break the tips off the toe bones to make claws that push through the skin for added grip. The skin is able to heal back over them.

5 The turtle shell is made from an inner layer of bone (including their ribs and backbone) and an outer layer of keratin (the same stuff as your hair and fingernails). Put your hands on your ribs and take a big breath in – can you feel them move? As turtle ribs form the shell, they can't use this movement to breathe. Instead they move their shoulders in and out, and some sea turtles are able to breathe underwater through their bottoms.

6 Lyrebirds aren't the only mimics – our very own starlings can copy lots of different sounds including other animals and even telephone ringtones. You can hear lots of songbirds in the UK in the spring as the males are singing to attract a mate. One that you will hear all year round is the robin, singing to defend its territory.

Amazing Animal Adaptations

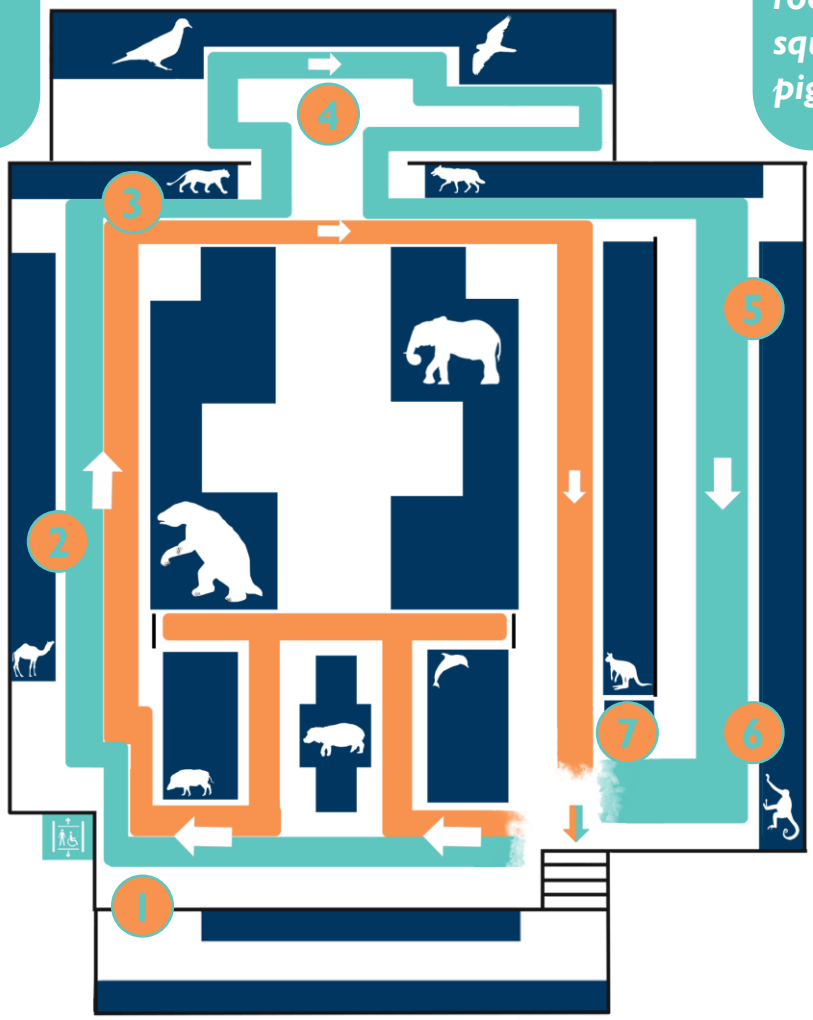
Follow the **Blue Route** to see these amazing adaptations. Are there any others that you can see?

Lower Gallery

3 *How fast do you think a cheetah can run? Can you see any features in the skeleton that help them move at speed?*

4 *Can you find an owl in the Discovery Space? How would you describe the shape of its face? How do you think this helps an owl to hear?*

5 *What colours can you seen in the teeth of our rodents (mice, squirrels, guinea pigs etc)?*



2 *Where do camels live? Clue: their long eyelashes keep sand out of their eyes…*

6 *Are your arms longer or shorter than your legs? What about the arms of a gibbon?*

1 *Can you spot the nesting gannets? To feed, they dive into the sea from a height. They have a sleek shape to slice into the water, and airpockets in the face and chest that cushion the impact.*

7 *A platypus is famous for its ducks-bill, but do you know how they use it?*

Turn over to see the answers…

Amazing Animal Adaptations

1 Gannets are masters of the plunge dive. You can see the streamlined head on the models, and they can close their nostrils to stop water going up them. Muscles in the neck protect it from breaking on impact, and webbed feet help them pursue their prey underwater.

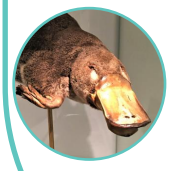
2 Camels live in deserts. Their feet splay out to stop them from sinking in the sand, and they let their body temperature rise to 42°C so they don't waste water sweating to keep cool. Their humps are made of fat that can be broken down for energy and water when times are hard.

3 Cheetahs can run as fast as 60 miles per hour (but only over short distances). They have long legs for a big stride, helped by a flexible backbone and special hip joints to make it even bigger. And their claws are always slightly extended like the spikes on runners' shoes.

4 Owls have amazing hearing, able to pin-point where a sound is coming from. The feathers of the face direct sounds to the ears, with one ear higher than the other on the head. Clever processing by the brain turns the signals from the ears to a location where the sound is coming from.

5 Some rodents have orange teeth. This is because they have extra iron in the enamel, making it extra hard. These front teeth (the incisors) keep growing, and they act like chisels to gnaw at their food. Rodents also have grinding molar teeth further back, and a special jaw joint that lets the lower jaw move forwards and backwards when they need to use the different teeth.

6 Gibbons can move at speed through the trees, grasping branches with one hand then the other in a type of movement called brachiation. Their arms are really long to get a bigger swing. They also have specialisations of the joints to increase their swing, and hands that are used like hooks.



7 The bill-like snout of a platypus contains cells that can sense the little electrical signals made by animals underwater. This helps them to find their prey. They have lots of other fascinating features – did you know that male platypuses have a venomous spur on the hind limb?

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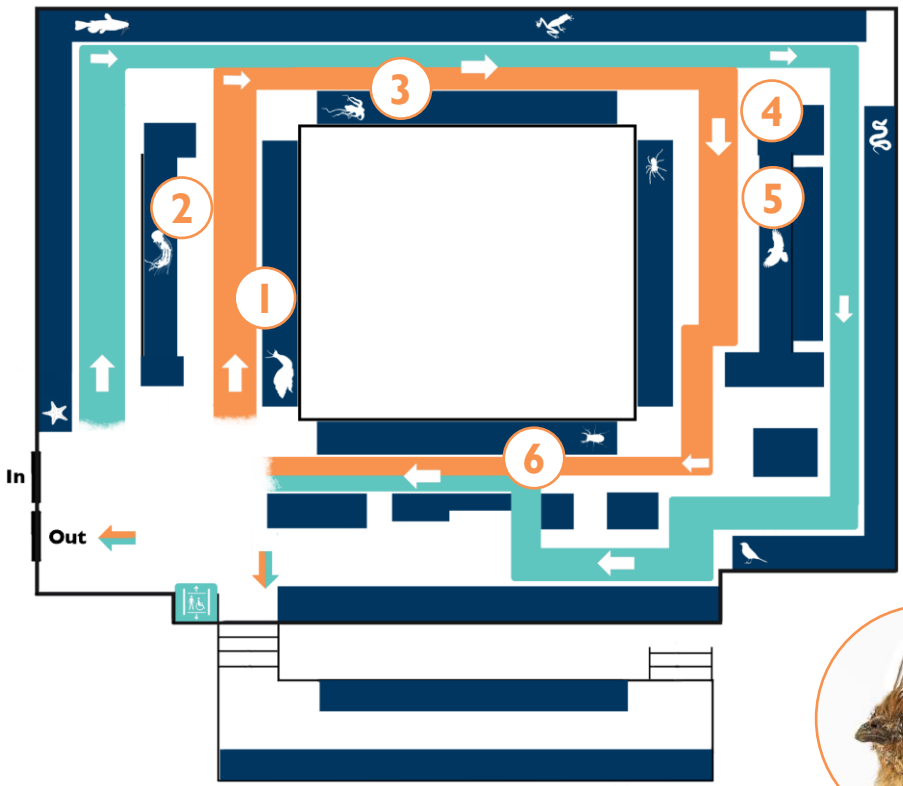
Upper Gallery

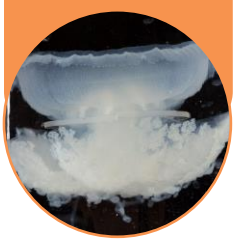
3 *Bivalve molluscs (clams, oysters etc.) lead many different lifestyles. How do you think these bivalves live?*



4 *Do you know what leatherback turtles eat? How do you think they catch their food underwater?*



2 *Jelly-fish sting, but do you know how? Turn over the page to find out.*



5 *This bird is called a hoatzin, but has some nicknames too. What name would you choose for it?*

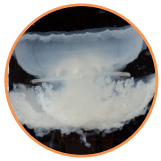
1 *Can you find the cone snails? How would you describe their patterns? Did you know: cone snails catch their prey by shooting a poison harpoon?*

6 *Take a look at the insect display and you can find lots of different colours and patterns with different uses. What can you see?*

Turn over to see the answers...

Amazing Animal Adaptations

1 The shells of cone snails come in lots of pretty patterns and colours, but they are dangerous animals. In the water they lie in wait for their prey to pass by, then shoot out a poison harpoon made from a feeding structure called a radula. Though their prey is usually fish, the toxins can be dangerous to humans too, so don't pick these shells up unless you are sure they are empty.



2 Jellyfish and their relatives (sea anemones, corals etc) have amazing stinging cells called cnidocytes (with a silent 'c' at the beginning). When a tiny hair-like trigger is activated, a coiled, barbed thread shoots out and stings the prey or threat passing by. Ouch.

3 These animals all have two shells, but live in very different ways:
Scallops are free swimming, 'clapping' their shells together to create a type of jet propulsion to move through the water.

Most bivalve molluscs are burrowers, but some take it to the extreme. Piddocks are able to use the ridges on their shells to bore through hard materials like stone and, in this case, thick oyster shells to find a place to live.

Some bivalves spend their lives stuck to other object. These are the shells of a type of clam called *Chama*, and they use cement to attach themselves to rocks. Oysters do the same.

4 Leatherback turtles eat jellyfish. They catch these squidgy creatures floating in the water using suction. Take a look under the skull and you can see some large bones hanging there. This is called the hyoid apparatus, and means the turtle can increase the size of the space inside the mouth to suck in water, and the food that's swimming in it.

5 The hoatzin has lots of wonderful features, but it is often called a stinkbird because of its diet. Unusually for a bird, the hoatzin eats leaves, which it has to store to digest. It has an enlarged crop (part of the digestive system) where it stores leaves, giving off the whiff of manure.

6 The leaf insect pictured on the map looks almost identical to a leaf, even down to the veins, to help it to hide. Some insects have warning colours – often red/yellow/orange and black – telling predators 'don't eat me, I'm poisonous,' or 'don't come close, I sting'. The atlas moth pictured to the left has spots on its wings that look like eyes, to make a predator think it is a much bigger and more dangerous animal.

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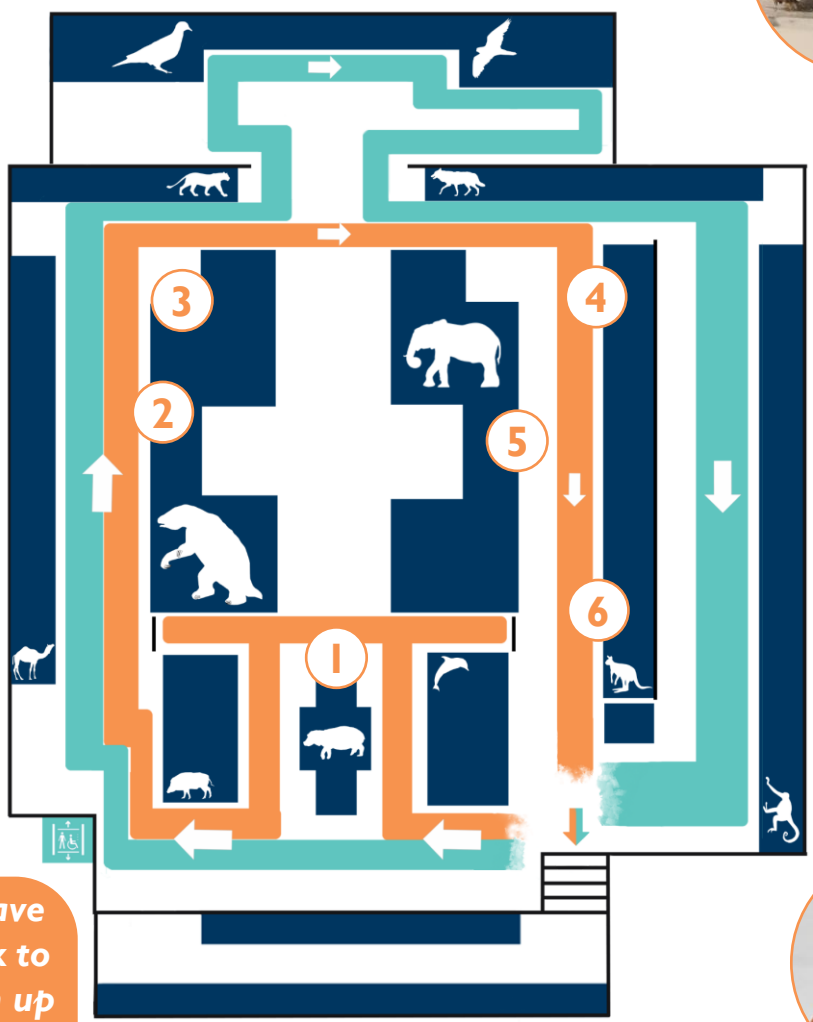
Follow the **Orange Route** to see these amazing adaptations. Are there any others that you can see?

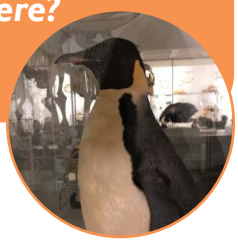
Lower Gallery

3 *There are two tiger skulls on display here, an adult and a very young cub. Apart from the size, what differences can you see between them?*

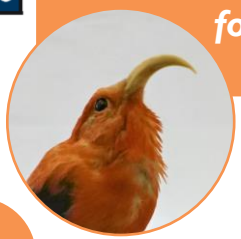
4 *Can you find the animals called tenrecs? Where are they from, and what do they remind you of?*



2 *Where do emperor penguins live? What do you think they need to survive there?*



5 *The Hawaiian honeycreepers are an amazing group of birds – look at all their different beak shapes adapted for the different foods they eat. What beak shape would you need for your favourite food?*



1 *Giraffes have a long neck to reach leaves high up on trees. Count the bones in the giraffe's neck? Does it have more, less or the same number as the other animals nearby?*

6 *Take a look at the marsupial display. These mammals come in many shapes and sizes, moving in different ways. Can you find a jumper, a burrower and a glider?*

Turn over to see the answers...

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1 Giraffes are the tallest animals alive today. A giraffe has seven bones in its neck, just as we do. Each bone is much longer, making it possible for a giraffe to raise its head to the tops of trees to feed on the leaves. They have a long tongue as well to strip the leaves off the branches, and special features of the blood vessels in the neck to help blood get to the brain.

2 Emperor penguins live in and around Antarctica. They even breed there over winter, when it can get really cold – often below -35°C. As well as feathers, they have a layer of blubber under the skin to trap heat, and penguins will huddle together to keep warm.

3 Adult and baby tigers feed in very different ways, and we can see this in the skull. The adult tiger (top) has big canine teeth for killing their prey, and slicing cheek teeth for eating meat. The adult also has huge cheekbones swinging out of the skull for the jaw-closing muscles to attach to, giving them a powerful bite.

The cub (bottom) has teeth that are barely breaking through. The muscles around the jaws are arranged for suckling on milk, and the cheekbones are much smaller. As the cub is growing, it has gaps between many of the bones in the skull, which are fused together in the adult.

4 Tenrecs live in Madagascar, an island in the Indian Ocean with a peculiar mix of animals. There are many different types of tenrec, and they play the roles filled by animals like shrews and hedgehogs in other places. They even look like shrews and hedgehogs. Some have their own unique features though, like the lowland streaked tenrec that makes sounds by rubbing special quills together on its back.

5 The Hawaiian honeycreepers have evolved from a single species of finch that arrived in Hawaii a few million years ago. Some have long, curved beaks for feeding on nectar, some have fine beaks for catching insects, some have beaks perfect for getting beetle grubs out of wood…

6 The marsupials include animals like kangaroos, koalas, wombats and opossums. They can move in very different ways. Kangaroos and wallabies have big back legs with long feet to help them jump. The marsupial mole has scoop-like hands for digging. The feathertail glider has skin stretched between its limbs to help it glide between trees. Can you see any others?