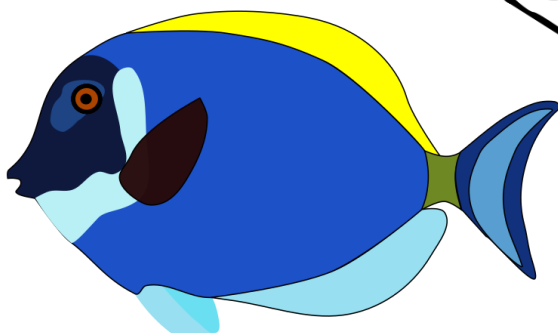
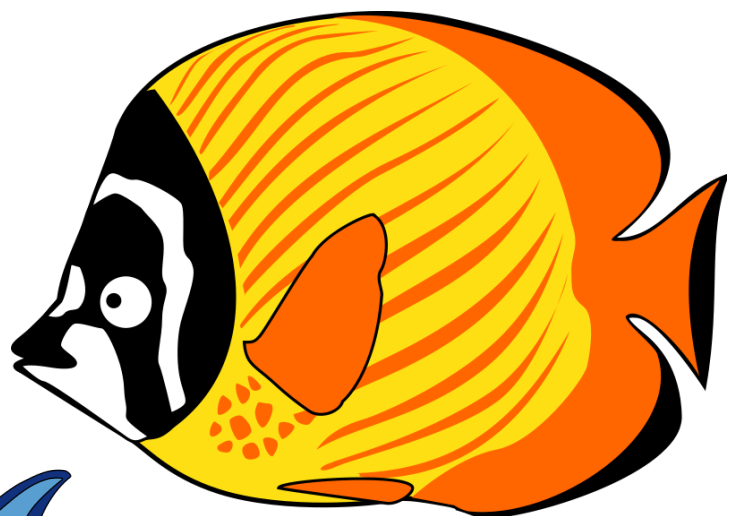
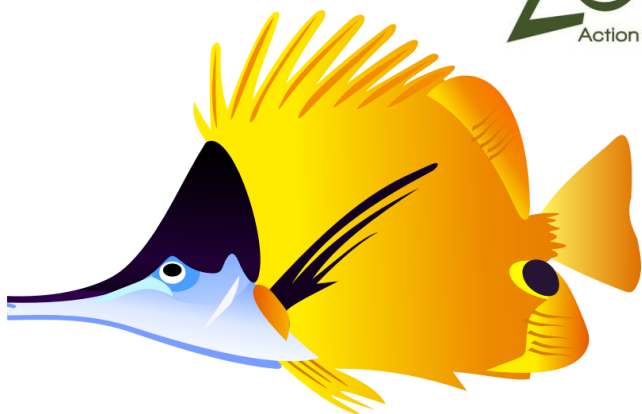




Activity Pack: Water Animals

This pack is designed to provide teachers with information to help you lead a trip to Colchester Zoo focusing on animals that live in fresh and saltwater habitats.

KS1 and KS2



How to Use this Pack:

This Water Animal Tour Guide pack was designed to help your students learn about animals from fresh and saltwater habitats and prepare for a trip to Colchester Zoo.

The pack starts with suggested aquatic and semi-aquatic animals to visit at Colchester Zoo, including a map of where to see them and which encounters/feeds to attend. The next section contains fact sheets about these animals. This includes general information about the types of animal and specific information about individuals at Colchester Zoo. This information will help you plan your day and your route around the Zoo to see the most of our aquatic and semi-aquatic animals. We recommend all teachers read through this and give copies to adult helpers attending your school trip.

The rest of the pack is broken into: pre-trip, at the zoo and post-trip. Each of these sections starts with ideas to help teachers think of ways to relate animals that live in water based habitats to other topics. Then there are a variety of pre-made activities and worksheets. Activities are typically hands on 'games' that introduce and reinforce concepts. Worksheets are typically paper hand-outs teachers can photocopy and have pupils complete independently.

Teachers can pick and choose which they want to use since all the activities/worksheets can be used independently (you can just use one worksheet if you wish; you don't need to complete the others).

The activities and worksheets included in this pack are for KS1 and KS2 students.

We suggest using the pre-trip activities/worksheets prior to your trip to familiarise your pupils with vocabulary, context, and the animals they will see during your trip. The at the zoo activities/worksheets typically require information your pupils can gather while they are at Colchester Zoo and are designed for completion during your school trip. The post-trip activities/worksheets are designed to be used after your visit to help consolidate learning and build on information gathered during your school trip. Within these sections, the activities/worksheets can be used in any order.

If you would like any more guidance, or have any questions about any of the information contained within this pack, please contact our education department at education@colchesterzoo.org

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Map KEYS

-  First Aid
-  Information
-  Gift Shop
-  Picnic Area
-  Play Area
-  Toilets
-  Fire Assembly Point
-  Face Painting

Saltwater animals to See at Colchester Zoo:



Download a more detailed map from our website:
www.colchester-zoo.com

Saltwater Animals to See:

1. Visit Penguin Shores or Inca Trail to see the **Humboldt penguins**.
2. Walk through the sea lion tunnel to see the **sea lions** underwater or see them from the surface.
3. Once through the sea lion tunnel head into the Orangutan house and find a mini **coral reef** with several species of coral and fish.
4. Head into Worlds Apart and find **fish** that live in the Caribbean Sea
5. At the top of the giraffe house you'll find the start of a new mini **coral reef** being established. In this reef you'll see lion fish and moray eels.

Map KEYS

-  First Aid
-  Information
-  Gift Shop
-  Picnic Area
-  Play Area
-  Toilets
-  Fire Assembly Point
-  Face Painting

Freshwater animals to see at Colchester Zoo:



Download a more detailed map from our website:
www.colchester-zoo.com

Freshwater Animals to See:

1. .Head to Worlds Apart and find **anacondas**, **piranhas** and several **Amazon river fish**.
2. .Walk through the **sea lion** tunnel to the **orangutans** and as you come out of the tunnel you'll see **giant Asian pond turtles** and **archer fish**.
3. .Across from the underwater penguin viewing windows there are a number of **freshwater fish**. One of these fish is extinct in the wild (the butterfly splitfin)!
4. **Flamingos** can be seen from the walkway next to the **gelada baboons**
5. .Just next to the flamingos our are family of **smooth coated otters**
6. .At the top of the **giraffe house** you'll find a number of different animals, one of which is the **lung fish**. Head across the giraffe and head down the ramp and at the bottom of the ramp our are **pygmy hippos** and **African cichlids**
7. .Next to **Rainbow Landings** are our **koi carp** in **Koi Niwa**
8. .Inside **Chimpanzee Lookout** are our **slender snouted crocodiles**.

Feeds and Talks to Attend:

Penguin Encounter (1 on the saltwater map) watch the penguins being fed.

Sea Lion Presentation (2 on the saltwater map) watch the sea lions show off some of their amazing adaptations!

Otter Encounter (5 on the freshwater map) they might get food, or a new toy to play with. The best time to look for them, since they sometimes hide in their burrows.

Visit www.colchester-zoo.com to see the 'Daily Timetable' for a full list of all talks, feeds, and shows and their times

Patagonian (Southern) Sea Lion

Habitat: Saltwater: Costal offshore rocks and islands

Distribution: South American coastline

Diet: Carnivore eating fish, squid, lobsters, krill and crustaceans. Also sea birds.

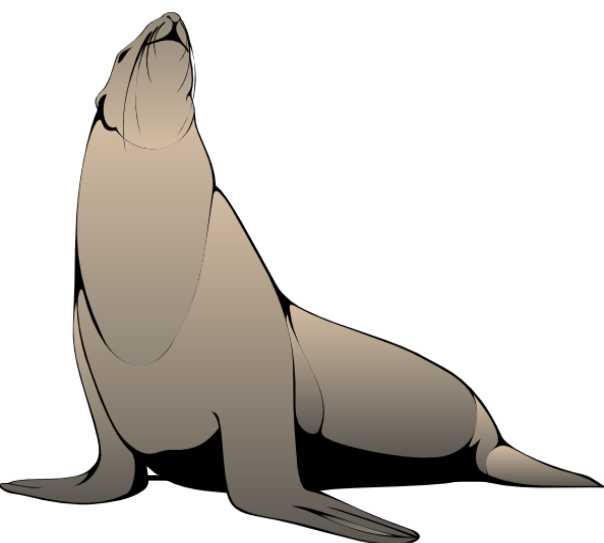
Longevity: Up to 25 years

Like many mammals the male sea lions are larger than the females reaching weights of 340kg and lengths of 2½m. The females may reach 144kg and 2m in length. The males compete over territory on the beaches where multiple females lives.

Sea lions are agile hunters, feeding on fish, crustaceans and squid. They also hunt penguins in the wild. The main predators of sea lions are large sharks such as the great whites and killer whales. They have many adaptations to help them swim, catch their food, and avoid predators. They are estimated to swim at up to 13.4mph (21.6km/h) but are usually much slower. They can hold their breath for over 10 minutes. They have many adaptations that let them hold their breath this long, including: slow heart rate, higher blood volume than land animals and higher content of oxygen-binding proteins. Because their water is very cold they have a thick layer of blubber under their skin to keep them warm and streamline their body.

Unlike seals, sea lions use their front and hind flippers for 'walking' on land. Seals rely on only their front flippers to move on land and are often very awkward. In contrast, sea lions are very mobile and can travel kilometres away from the beaches. However, sea lions are mainly found near the shore since it helps them escape predators. If land predators appear they hide in the water, and if water predators appear, they move onto the land.

Colchester Zoo has five female sea lions. They are named Sydney, Milan, Atlanta, Paris and Winnipeg. They spend a lot of time training and know many commands such as lifting their flippers and being touched all over their body. This allows the keepers to check them for injuries and medication to be given to them.



Humboldt Penguin

Habitat: Saltwater: Cold coastal waters and sandy/scrubby shorelines

Distribution: Peru, Chiles and islands off the west of South America

Diet: Carnivore eating crustaceans, krill, squid and fish

Longevity: 25-30 years

Humboldt penguins are a medium sized penguin, about 65cm tall and weight about 4.2kg. The feathers are black on the upper parts, light on the lower section and have a black stripe across their chest. Like all penguins they are flightless, since their wings have lost the flexibility at the elbows and become more like flippers. These 'flippers' allow them to swim up to 25 km/h 'flying' underwater, essential for catching fish and escaping predators.

The Humboldt penguins live in a climate much like that of the U.K. however, the seas they fish in are cold and thus they have a layer of insulating fat to protect them from the cold water. They also have waterproof tips to their feathers which keeps their skin and fluffy under feathers dry. Humboldt penguins have shorter plumage than other penguin species.

Humboldt penguins excavate burrows to nest in, usually about 3 metres in length. At the end is a small chamber which they line with sticks, mosses, lichen and their own poo (guano). Incubation of the two eggs shared between both sexes, they often pair for life and stay with their mate.

The primary threats for this species is accidental capture in fishing nets (resulting in drowning), illegal hunting for food and illegal capture for the pet trade. Historically, populations declined due to over-exploitation of guano (which the penguins require for their nests). It is still harvested in some parts of their range, but no longer a major threat.

There are lots of Humboldt penguins at Colchester Zoo living in two separate breeding colonies. At Penguin Shores get an underwater view of them swimming, or at Inca Trail view the penguins from above. The penguins all have unique markings of black spots on their bellies. Look for the signs at the enclosures and see if you can identify the names of all the penguins!



Soft Corals

Habitat: Saltwater: Wave-exposed areas of reefs. Also calmer waters, such as lagoons, on steep slopes, under overhangs and at depths of thirty metres or more.

Distribution: Found globally in temperate and tropical seas.

Diet: Zooplankton

Longevity: Unknown

Coral is an animal which has a symbiotic relationship with plants that provide the coral with energy through photosynthesis. The coral will also eat free floating food called zooplankton to gain additional energy.

Soft corals do not make a stone like case around themselves, unlike hard coral, that does.

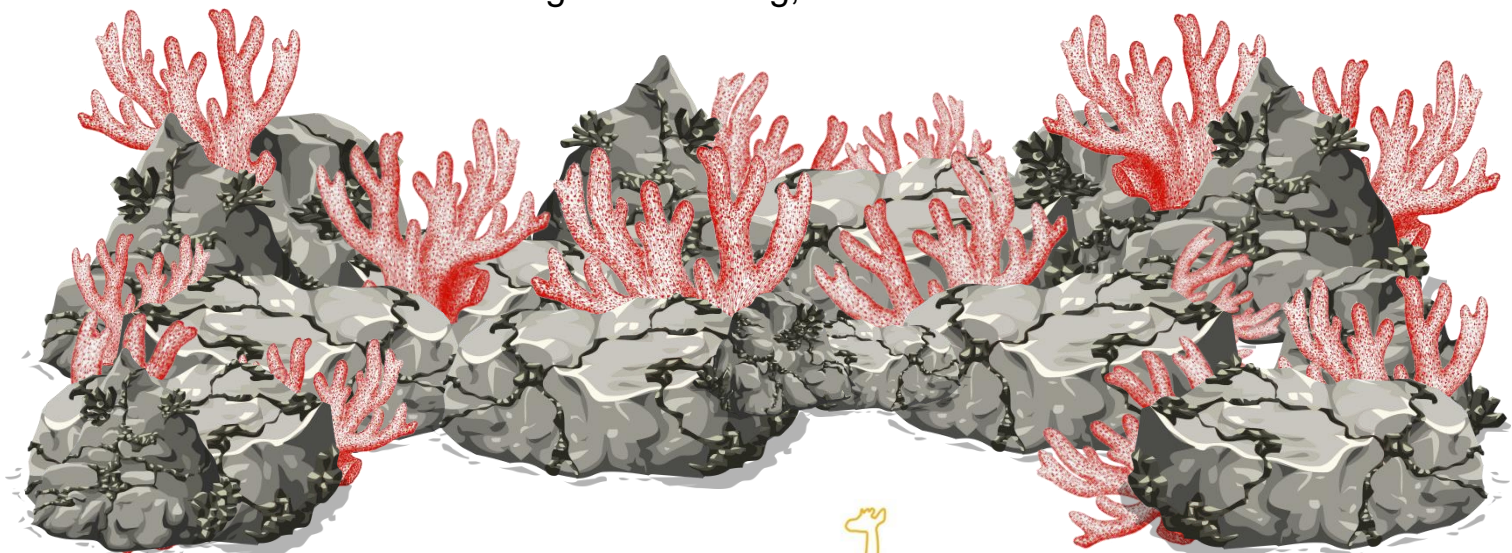
There are a number of soft corals at Colchester Zoo, with most being found in the marine tank in Orangutan Forest.

The species of soft coral include:

- Leathery soft coral
- Sea fan
- Leather coral
- Cabbage leather coral

Coral reefs, which are made up of thousands of coral can be found all over world seas. With the Great Barrier Reef off the coast of Australia being the most famous. However the seas around the U.K. are also home the many species of coral.

Coral is a vital home to many species of fish, invertebrates, plants and other marine life. However coral is threatened by rising seas temperatures, bleaching, the pet and souvenir trade and damage from fishing, boats and tourist divers.



Marine Fish



Red Lionfish *Pterois volitans*

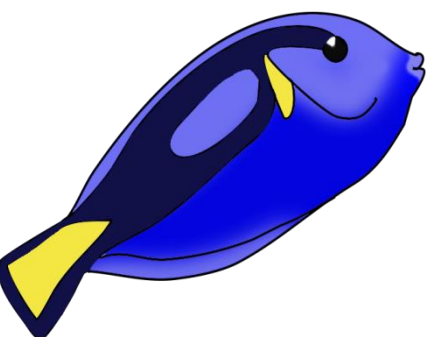
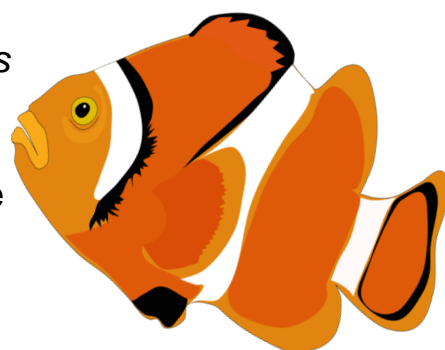
Found in the coral reefs of the Pacific. They are an invasive species in the Caribbean and east coast of the USA and are out competing the native fish for food and as a predator themselves are affecting fish numbers that are already low due to over-fishing and pollution.

As a defence they have several venomous spines to stop predators eating them.

Maroon Clownfish *Premnas biaculeatus*

Found in the coral reefs of the Indo-Pacific including the Great Barrier Reef. Like all clownfish this species forms a beneficial relationship with sea anemones, become immune to the anemones sting.

Highly aggressive and territorial, they will defend their host anemone from other clownfish.



Blue Tang *Paracanthurus hepatus*

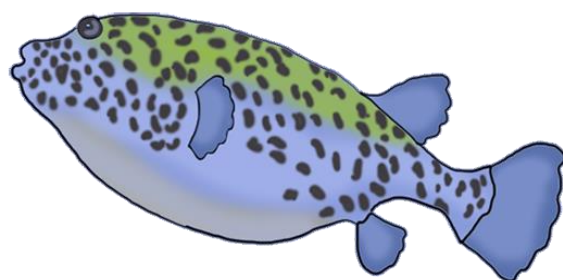
Found in the Indo-Pacific reefs, this fish has a large range however doesn't appear in large numbers anywhere.

As a defence they have a several spines to defend themselves from predators.

Blackspotted Puffer Fish *Arothron nigropunctatus*

Found in the Indo-Pacific, apart from the Red Sea, preferring reef slopes. This fish is solitary and day active (diurnal).

This puffer fish has no spines but will still inflate (using water or air) to deter predators. They ranges in colour from brown to yellow.



Otter

Habitat: Freshwater: Shallow wetlands and rivers in rainforests and woodlands

Distribution: Southern and Southeast Asia, India and China

Diet: Carnivore eating mainly fish, but also frogs, crabs, insects, rats and birds

Longevity: Approximately 10 years in the wild, up to 20 in captivity

Otters are excellent divers and swimmers. They can hold their breath for up to 20 minutes when swimming underwater. They close their ears and nostrils when underwater to prevent water going up their nose. They have a third clear eyelid (called a nictitating membranes) which covers their eyes when swimming and prevents dirt getting in (built in goggles). They use their sensitive whiskers to find prey underwater.



Otters are very skinny and rely on their fur (instead of a layer of fat) to keep them warm. Their fur has a thick dense bottom layer to keep them warm, and a long waterproof top layer to keep them dry. When swimming slowly, they paddle with their webbed paws. When swimming quickly, the front limbs are kept close to the body while their back legs and their flattened tail propels them forward. Their tails are powerful and long and can make up 60% of their body length!

Otters are very playful and are among the few mammals that play even as adults and is an important social activity. They are often seen in large family groups, playing in the water. They live in burrows near the water's edge. Smooth-coated otters are the largest otters in Southeast Asia. They get their name from their shorter, smoother coats which appears velvety and shining. The Asian Short-clawed Otter is the smallest of the 12 species of otter.

Colchester Zoo has two different types of otter. The **Asian short-clawed otters** live in the same enclosure as the binturongs. The **smooth-coated otters** are on the other side of the over-head walkway (next to the flamingos). There is an adult pair of these otters, a female called Chea and a male called Kong Kea. Numerous adult and offspring of the pair also live with them in a large family group.

Anacondas

Habitat: **Freshwater:** Streams, and wetlands

Distribution: South America, east of the Andes

Diet: Carnivore eating large rodents, tapirs, pigs, fish, turtles and birds

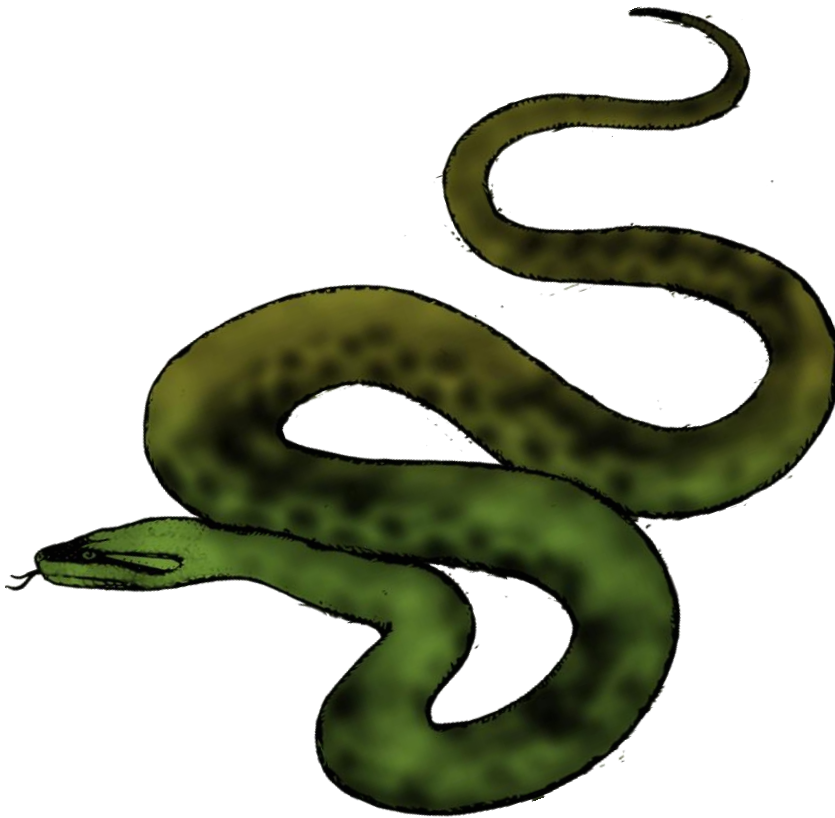
Longevity: 10-15 years in wild, over 30 in captivity

These are some of the largest snakes in the world. Green anacondas are the heaviest of all the snakes, a snake around 5m long could weigh over 90kg! The longest ever recorded anaconda was 6.3m long, potentially much longer snakes (over 12m long!) could exist in the dense rainforest.

Anacondas are very good swimmers and can stay underwater for over 30 minutes. They also hide in the water with just their nose above the surface. They will stay like this for hours waiting for prey. They have an excellent sense of smell. They also have heat sensors that detect when prey is near. When they catch prey, they grab it with their long teeth, and then constrict it, wrapping their bodies around the prey to crush it. They are not venomous.

Rainforest destruction threatens the habitat of this species. Larger snakes are also hunted for their skins and juveniles are frequently caught for the pet trade.

Colchester Zoo's green anacondas can be found in the Worlds Apart Exhibit.



Pygmy Hippopotamus

Habitat: Freshwater: Tropical rainforest and swamps

Distribution: Western Africa

Diet: Herbivore eating leaves, shoots, roots and fruit

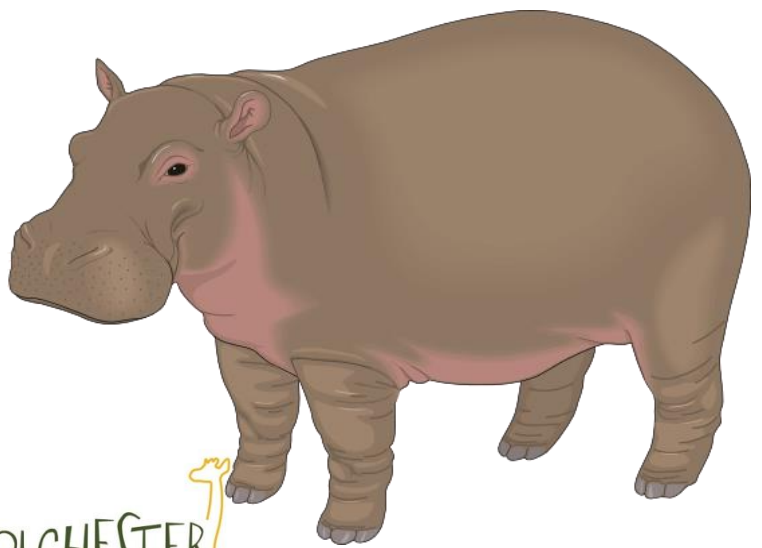
Longevity: 35 years in the wild, up to 42 in captivity

The Pygmy hippo is much smaller than the common hippopotamus. It is only a metre tall at the shoulder and weighs just 272 kg. Young are about the size of a housecat. They have smooth, almost hairless skin that is brown-black. They secrete a white substance from their pores which acts as moisturiser. Pygmy hippos do not have webbed toes (like the larger hippos) because they spend more time on land. When threatened, they retreat into forest cover rather than the water.

Despite their small size, pygmy hippos can be aggressive when threatened or defending their territory. They are not social animals, preferring to live alone or in pairs, avoiding other hippos. Pygmy Hippos have large territories, males cover 160 hectares, females 40—60 hectares. They have several resting places which they exclusively use for sleeping. They are nocturnal, usually active between 6pm and midnight when they wander around the forest floor in search of fallen fruit and other food.

Because pygmy hippos have such large ranges, they are severely affected by deforestation. They are also endangered due to hunting for food and hunting for their teeth. It is hard to study in the wild, but estimates suggest there are fewer than 2,500 left in the wild.

Colchester Zoo has two adult pygmy hippos, our male called Freddy, and our female called Venus. They are a rare species, and are part of an important breeding programme. In the past they had young born. When they reach adulthood they are moved to other zoos to continue the breeding programme.



Red-Bellied Piranha

Habitat: Freshwater: Warm freshwater

Distribution: Amazon, Paraguayá rivers, as well as lakes, streams and flooded forests of South America

Diet: Omnivorous scavenger and forager; fish, crustaceans, insects, fallen fruit, plants and dead or weak animals.

Longevity: 20 years

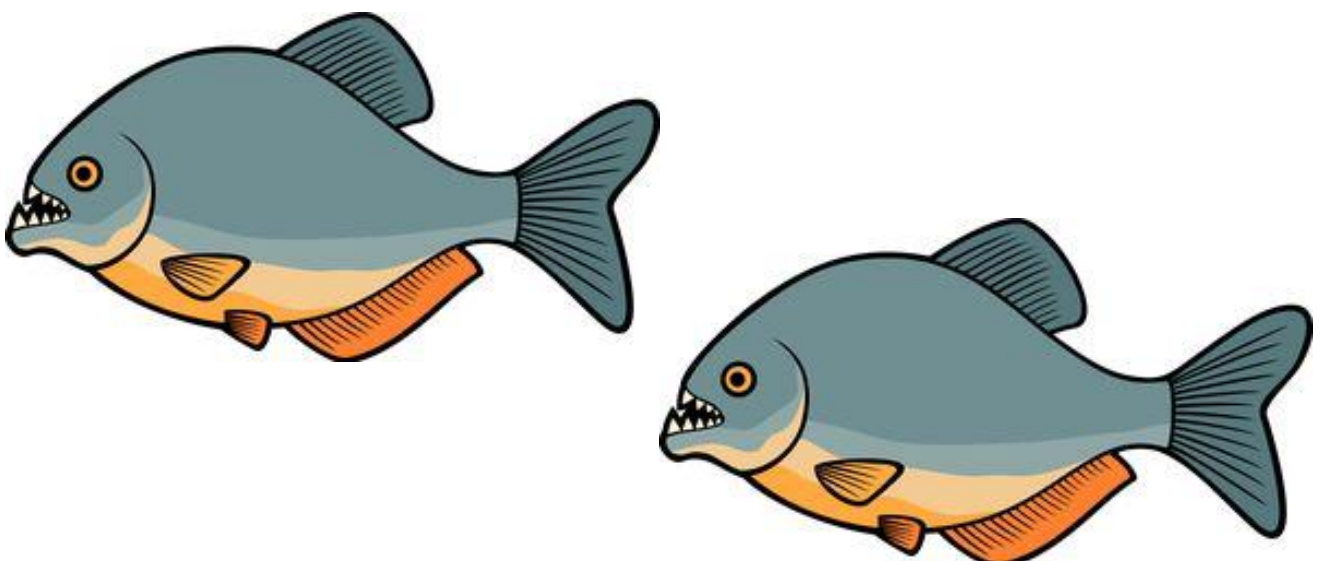
Red-bellied piranha's are often seen as ferocious predators, however this is not true and a myth created by movies and media. Red-bellied piranha's are quite shy animals. It is true piranhas will conduct feed frenzies, however these are very rare and only occur if the piranhas are close to starvation.

They will eat fish, mammals and birds but only if the prey is dead or weak due to injury. They commonly eat plants and insects.

Piranha's live and move in shoals (groups) to provide protection from predators such as river dolphins, large fish, caiman and aquatic birds and mammals. Young piranha's forage during the day whereas the adults forage at dawn and dusk.

Due to their large range river habitat, the conservation status is currently unknown, however increase demand of piranhas for the pet trade is a cause of concern and may affect numbers in the future.

Colchester Zoo's shoal of red-bellied piranha can be found in Worlds Apart.



Chilean Flamingo

Habitat: Freshwater and Saltwater: Coastal mudflats, estuaries, lagoons and salt lakes. Can be found living 4,200 metres above sea level.

Distribution: Chile, Peru, Argentina and Ecuador

Diet: Algae and plankton

Longevity: 50+ years

There are six species of flamingo, four species in the Americas and two in Africa. The Chilean flamingo is found in the Andes Mountain regions of South America and like all species of flamingo live in large flocks of several thousands.

The flamingo is famous for their pink plumage which is a result of their diet. Chemicals found in the algae and plankton turn the feathers pink. Chick and juveniles remain grey until reaching adulthood.



In order to eat this unique food the flamingos bill is curved and they actually eat upside down. Their beaks act like strainers, catching the food as the flamingo forces water in and out of its beak.

Flamingos form pairs to breed and both parents work to build the nest, incubate the egg and rear the chick. However, they will only breed when in a large flock. Colchester Zoo previously had a small flock that was too small to breed. Getting new flamingos was difficult as there weren't many in other zoos. To overcome this Colchester Zoo 'tricked' the flamingos into thinking they were part of a larger flock. This was done by installing mirrors around their lake home, and all the reflections would appear as if there was a larger amount of flamingos.

The mirrors worked and the flamingos started to pair bond, nest building and laying eggs which resulting in hatchlings.

Colchester Zoo flamingos can be found at the bottom on the large lake by the gelada baboons.

Koi

Habitat: Freshwater: Cold freshwater

Distribution: Domesticated in Japan now found worldwide as pets.

Diet: Omnivores feeding along the bottoms of ponds and lakes.

Longevity: 50 years. However one koi was found to be over 200 years old.

Domesticated from the common carp, which is found throughout Europe and Asia, when in Japan during the 1820's common carp were bred to show more colour.

The name koi is a Japanese word which has two meanings. Koi means carp but can also be translated as affection or love. This has led to the koi being symbols of love and friendship.

There are a number of varieties based on colour and pattern with 22 varieties being recognised, however new varieties are bred every year.

Commonly kept in large groups in ponds and ornamental water gardens as pets across the world, with many being worth several hundred pounds.

As a domesticated species they are not threatened, in fact released (either by accident or on purpose) koi are considered a pest and an invasive species. Koi are hardy fish and are resistant to many infections and parasites. Within three generations, released koi return to natural darker colours which means they can avoid local predators.

As koi cause lots of water movement they disturb the silt which reduces the amount of aquatic plant life and can result in the water becoming undrinkable for other animals.

Colchester Zoo's koi can be found at Koi Niwa next to Rainbow Landings.



African Cichlids

Habitat: Freshwater: Tropical freshwater lakes

Distribution: Lakes through out Africa

Diet: Omnivores

Longevity: Unknown

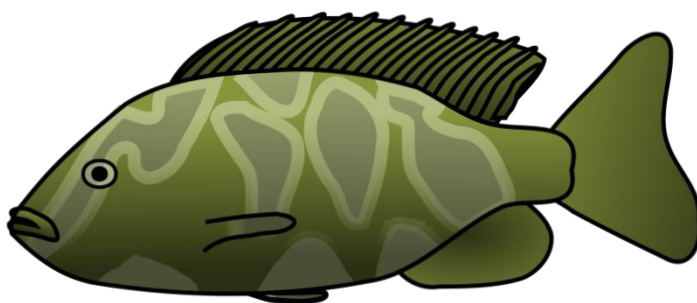
Colchester Zoo has a number of African cichlids, which can be found by the pygmy hippos and include:

- Fairy cichlids
- Cobalt blue zebra cichlids
- Lombardo's African cichlids
- Slender tapir cichlids

Colchester Zoo also has the critically endangered alkali cichlid *Stomatepia maniae*.

The alkali cichlid is found in Lake Barombi in Cameroon and is an omnivore feeding from the bottom of the lake. The reason why this species is classed as critically endangered is due to several factors. The main threat they face is pollution from farming and development of the lake side for tourist. Deforestation also leads to stronger winds over the lake which makes the oxygen levels in the lake to become unbalanced. This causes low oxygen water being mixed into the high oxygen water where the cichlids dwell, which in turns leads to the fish suffocating due to the introduction of lower oxygen levels.

All chiliads are threatened from pollution as they are only found in lakes with little water movement. Over-fishing and the introduction of predator fish have caused many species of cichlids to become endangered.



African Lungfish

Habitat: Freshwater: Shallow swamps, marshes and streams.

Distribution: Throughout Africa

Diet: Omnivores: fish, crustaceans, amphibians and plants

Longevity: 80+ years

As the name suggest lungfish have lungs that it can use to get oxygen from the air. This adaptation allows the lungfish to survive when the waterways they inhabit dry up. When this happens the lungfish creates a burrow which is then sealed when the mud dries out.

The burrow prevents the lungfish from being found by predators and from drying out itself. They are able to remain in the burrow for several months. As well as their lungs, the lungfish also has gills, although they are much smaller when compared to other fish their size. It can use these to get oxygen from water.

Looking more like a eel than a fish, the lungfish has long body with small fins to crawl along the bottom. When swimming, moves more like an eels.

Lungfish lay eggs in burrows which they defend from predators. When the young hatch they resemble tadpoles with gills on the outside of their body. They do not develop lungs till they are older.

Lungfish are often dug up from their burrow during the dry season by humans to eat. With improving technology to find them, their numbers are starting decrease.

Colchester Zoo's lungfish can be found at the top of the giraffe house.



Slender-Snouted Crocodile

Habitat: Freshwater: Rivers and lakes within rainforest

Distribution: Central and Western Africa

Diet: Carnivore: mainly fish but have been seen eating mammals, reptiles and birds

Longevity: Up to 50 years in captivity

A shy and secretive crocodile, they can be found several metres up a tree resting on branches. Unlike other crocodiles, they are solitary, apart from during the breeding season, which varies depending on where they are.

They mainly eat fish. Their long slender snout is perfect for moving through the water quickly to catch fast moving fish. The long snouts also allows the crocodile to get prey from burrows and get in between roots of trees to catch hiding fish and other animals.

Like all crocodiles, the females lay eggs in a nest on the land. Compared to other species of crocodile they lay a small number of eggs, roughly 16 eggs, whereas the Nile crocodile lays between 25 and 80 eggs. After 110 days the young hatch. This is a long incubation period compared to other crocodiles but the young slender-snouted crocodiles are much larger when they hatch compared to other species.

Slender-snouted crocodiles are classed as critically endangered. They are no longer found in much of their historic range. Their surviving population has decreased by 50-80%.

There are many reasons for this drop in population such as poaching for skin and meat, habitat lose, over-fishing and being disturbed by increasing human activity.

Our slender-snouted crocodile can be found inside Chimpanzee Lookout.



Giant Asian Pond Turtle

Habitat: Freshwater: Streams, marches and rivers as well as rice fields. Often found on the land under plants.

Distribution: Cambodia, Vietnam, Laos,,

Diet: Herbivore. Aquatic plants but is thought to eat some small animals such as insects

Longevity: 20-30 years

Very little is know about this species of pond turtle. What is known is that this hard shelled turtle is semi-aquatic, living in water and on land close to water comfortably.

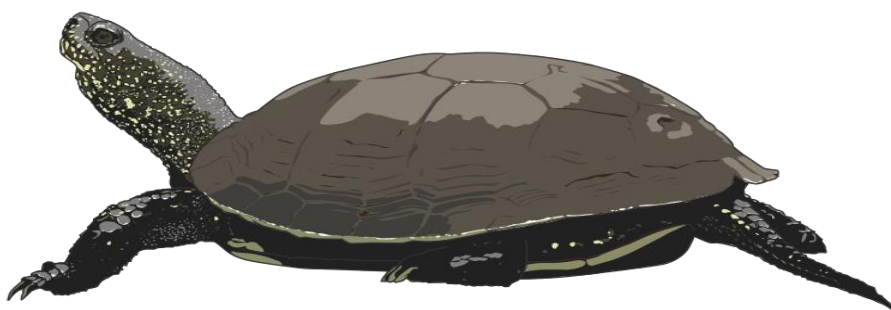
Females lay 4-6 eggs which hatch after being incubated for 100 days. Researchers have noticed that the male is aggressive towards the female by biting her head and neck as part of their courtship, which last several hours.

Giant Asian pond turtles are classed as vulnerable because of the uncontrolled market for freshwater turtles as pets and for meat. They are also caught for use in the traditional medicine trade as some people believe there are health benefits to consuming these turtles.

The demand has increased of the last 10 years as the economy of several Asian countries improve and develop.

There are several international organisation and treaties that are working to protect pond turtles in an effort to prevent large population drops.

Our giant Asian pond turtles are found in Orangutan Forest to the left of the entrance.



Pre-Trip Classroom Ideas:

These are ideas to get teachers thinking about how to introduce the subject of animals that live in and around water. Use these ideas as a starting point with or without the pre-made activities and worksheets on the next pages.

- .Learn vocabulary words with students (see next page for list)
- .Discuss the difference between freshwater and saltwater, have pupils come up with their own definition
- ."Pack a bag" to go somewhere far away (e.g. the seas of Antarctica, the lakes of Africa, etc.). What would the weather be like? What would they need to pack? How does different clothing help us?
- .Play a guessing game about aquatic zoo animals. Count and graph how many clues it takes for each animal. Which animals are easiest to guess?
- .Cut pictures from magazines or find pictures online and make a class collage of animals that live in and around water they want to see at the zoo.
- .Look at the some of the key adaptations some of the animals have to survive in water and around water.
- .What adaptations would humans need to survive under water?
- .Collect pictures of animals and divided them into groups: freshwater/saltwater, tropical water/cold water etc.
- .Build habitat dioramas representing freshwater and saltwater habitats. Place plastic animals, plush animals, or pictures of animals in the correct habitat based on their adaptations.
- .Compare animals that lively entirely in water to animals that live on land as well. What are the key difference and also what do they have in common? A Venn diagrams can be used to show this.

Pre-Trip Classroom Ideas:

Vocabulary Words:

Adaptation: A feature of an animal (or plant) that helps it survive in a specific habitat or lifestyle (predator, scavenger, etc.)

Aquatic: Refers to anything that lives in water

Behavioural Adaptation: A behaviour that helps an animal survive (e.g. penguins huddling together for warmth)

Carnivore: An animal that mainly eats meat

Community: All of the plants and animals that live in a specific area

Consumer: Any of the animals (because they must eat food to get energy)

Ecosystem: The complex community of interacting plants and animals in a specific habitat

Habitat: The type of place an animal lives (e.g. river, rainforest, etc.)

Herbivore: An animal that mainly eats plants

Marine: Refers to saltwater i.e. marine mammal such as sea lions

Physiological Adaptation: An internal change that helps an animal survive (e.g. giraffe's specialised veins and arteries to get blood through it's neck)

Predator: An animal that hunts and eats other animals

Prey: An animal that is eaten by other animals

Producer: Most of the green plants (because they can produce their own food)

Scavenger: An animal that feeds on dead animals

Species: A group of animals that have similar characteristics and can produce offspring.

Semi-aquatic: An animal that can survive on land and use the water to aid survival i.e. smooth coated otters sleep on land but hunt in the water.

Water Cycle: The process of how water moves from sea to air to land and back again

Pre-Trip Classroom Activities:

Animal Mixer

How do aquatic animals communicate with each other? What makes animals unique and different from other animals? Pupils will think about this when they work to communicate without speaking

Time: 15 minutes

Subjects: Drama, Physical Education, Science

Materials Required: Animal pictures, one per pupil

Start with a discussion of how aquatic animals communicate and how the pupils would communicate if they were animals that live in the water. Then discuss how animals that don't make noise communicate. Do they twitch their fins or move in funny positions or swish their tail? Once the students have all thought about how animals communicate, explain that they are going to become animals.

There are many dangers in the water and animals that are predators are also often the prey. Discuss how communication can help keep the animal safe and also get food. Furthermore the sea is a huge place and animals need to find mates. Look at how certain animals can call to other to attract their attention (look at whale song)

Once they have all assumed their animal identities, the pupils need to find the rest of their animal group. However, they can't speak, so to find their group they must communicate like animals, either through body language (e.g. making gills out of their hands for fish) or sound (e.g. squeaking like dolphins).

Explain that they will be given a picture of an animal they need to act like. When the pictures are handed out they should look at it, but they need to keep it secret and not tell anyone what it is. After everyone has a picture, have them get started and try to find the other pupils in their group by making the appropriate animal action/sound. Once they find someone in their group, stay with them and try and find more. Continue until all the animals are in their group. As a conclusion go through the groups and have each demonstrate how they managed to find each other.

* To make it easier, hand out the same number of pictures of each animal, e.g. in a class of 30 hand out 6 pictures of 5 different types of animals. To make it harder, have uneven groups of animals. Ensure you tell the pupils if the groups are uneven or they may be confused.

Pre-Trip Classroom Activities:

The Gummy Bear Soak

Why can't freshwater fish survive in saltwater and why can't saltwater fish survive in freshwater?

Time: 10 minutes set up.

Subjects: Science

Materials Required: Gummy bear sweets, 2 clear plastic cups, water, salt, ruler and digital scales.

First measure and weigh the gummy bears and record the data on a table. Fill both the cup with water then add a tablespoon of salt to one of the cups. Mix in the salt and then add a few gummy bears to each cup.

Leave alone for 12 hours then measure and weigh the bears. After 24 hours, measure and weigh the bears. After 48 hours, measure and weigh the bears. Students can also take pictures of the bears at each stage for a visual record.

After, create a graph to show the findings. What does the graph show?

As an extension activity, add different gummy bears to distilled water and leave in the cup for 24 hours. You will notice the bears swell. Take the bears out and add them to saltwater and leave for another 24 hours. This shows how salt can draw water out and bring the bears to almost the original size. Imagine the bears are freshwater fish that have been put into saltwater. Would the freshwater fish survive?

This activity shows how osmosis works and it is this process to maintain the balance of water between the fishes body and the water around them that shows why saltwater fish can not survive in freshwater and why freshwater fish can not survive in saltwater.

This activity can also be used as an introduction into the properties of salt, as well as its importance but also health concerns when there is too much salt. This activity could also be tied into geography study of salt in the natural world i.e. the Dead Sea.

Please note: Do not let children eat the gummy bears that have been in the either of the cups.

Pre-Trip Classroom Activities:

Stop The Flood!

This is to show how habitat loss can cause a natural event such as flooding to become a natural disaster, which affects humans and nature.

Time: 30-45 minutes

Subjects: Science and Geography

Materials Required: Tray, jug of water, art and craft items to represent houses etc. and a material that absorbs water quickly and easy. i.e. Sodium Polyacrylate, which is found in nappies (available to buy separately online, or rip open clean nappies to get it).

This activity can be done on a large scale demonstration for the whole class to see or have the pupils divide into groups, with each group having their own materials. Within the tray create a small town using art and craft materials. Have one end of the tray be the town, which is slight raised, and the other end be a lake or part of a river with a small amount of water in.

Between the water and the town place the absorbent material. This material represent a peat bog or woodland etc. Once everything is in place pour the water into the lake. When the water reaches the material the excess water is soaked up and thus keeping the town safe. This shows how natural habitats such as peat bogs, woodlands as well as marshes help control flooding.

Now repeat but this time take away the absorbent material. This time as you add the water the water reaches the town and floods it. This happens through out the world when the natural barriers are lost.

This is to shows why peat farming in the U.K. can lead to extreme flooding. Removal of other types of wetlands can have similar impacts on flooding. For example, it was partially due to removal of coastal wetlands that hurricane Katrina had such devastating impacts in the U.S.A. in 2005. Removal of trees on land can also contribute to flooding since their roots draw up water and naturally prevent the build up of water on land. As an extension, pupils can look at some of the major flooding that has happened over the years in the U.K. and across the world and see if there is a link to habitat loss.

Post-Trip Classroom Activities:

Who Am I

This works as either an introduction to some of the huge number of aquatic animals, or a reminder at the conclusion of a unit about what the pupils have learned.

Time: 10-20 minutes

Subjects: Science

Materials Required: Pictures of different aquatic animals, clothespins

Have the pupils stand in a line, with their backs to the teacher. The teacher clips an animal picture to their back using the clothespins. The pupils should not see, and are not supposed to know what their animal is, everyone else can see their picture.

Have pupils walk around the room and ask questions to each other to guess what animal is on their back. Pupils are only allowed to ask yes or no questions (no asking what their animal is called!). Encourage pupils to ask questions based on information they have already learned. For example, if studying food chains have them ask: am I a predator? If studying colour and camouflage have them ask: do I have stripes? If studying classification, have them ask: am I a mammal? To make the pupils interact more, and ask more varied questions, have a rule that they can only ask another pupil one question, then they need to find someone else to ask.

After a pupil has guessed their animal, take the picture of their back and show it to them. If they have finished very fast, or you want the game to go on longer, give them another one to keep guessing. Depending on how hard the pictures are, some pupils will correctly guess 3 or 4 while some are still guessing their 1st. If some students are struggling, give them hints to make sure everyone guesses at least one correctly before ending the game.

To make this activity easier, review all the animal pictures to start. For older groups do not review the animals and consider using more obscure animals (e.g. narwhals). If you are using harder animals, make sure they are ones the pupils already know. For harder animals, consider having a label on the picture with the animal's name and facts so that the other pupils are giving correct information.

At the Zoo Ideas:

These are ideas to help your class focus during their trip to the Zoo. Use these ideas as a starting point with or without the pre-made activities and worksheets on the next pages.

1. .Use the worksheets in this pack to help focus your students
2. .Encourage students to spend time observing the animals. Some unique animal behaviours can only be seen if we watch very carefully.
3. .Have students make a detailed sketch of a zoo animal, sketching encourages careful observation.
4. .Take photos of the animals and around the Zoo. When you get back to school make a photo scrapbook of your trip.
5. .Attend the feeds or talks and have your students take notes. Often the keepers are available after to ask questions if you want to learn more.
6. .Pupils can examine the animal enclosure and determine, if they were an animal at the Zoo, which enclosure would they want to live in? Why?
7. .Have pupils keep track of how many of each type of marine animal and freshwater animal they see. Which type is the most common at the zoo. Why do they think the zoo has the most of that type of animal?
8. .Count how many animal enclosures have pools of water for the animal to use? Does this mean the animal is aquatic?
9. .The animals with large pools need complex filter systems to keep the water clean. Head to the Koi and look at how their filter works and why it is important.

At the Zoo Activities:

Camera

This activity gets students focusing quietly and independently, and works well when pupils are taking real photos to get them to decide what to take photos of before hand.

Time: 15 minutes or more

Subjects: Art, ICT, observational Science skills

Materials Required: cameras (optional), small bits of card (optional), pencils (optional).

Before starting, take time to talk with the pupils to consider what make interesting subjects for good photos. Should they take close up images? Are walls interesting? Is it easier to take photos of an animal that moves a lot of an animal that's resting?

Find an animal that the pupils can stay focused on rather than get over excited when they see the animal. Divide the pupils into pairs. Within each pair one student takes the role of photographer and one takes the role of camera. The child pretending to be the camera keeps their eyes closed while the photographer leads them to an interesting viewpoint.

The photographer chooses when the camera opens their eyes and takes a picture. A good way to do this is to have the photographer gently tap the camera on their shoulder to have them open their eyes. When the camera opens their eyes, their job is to try and remember and visualize everything they see in front of them: Do they see an animal? How many animals? What is the enclosure like? What textures do they see? When taking photos it's best if the camera only has their eyes open for 5-10 seconds, then closes them again. Have the photographer move the camera to a few different locations. Do they see different animals? Is there a slightly different view point? After they've taken a few 'photos' have them switch roles.

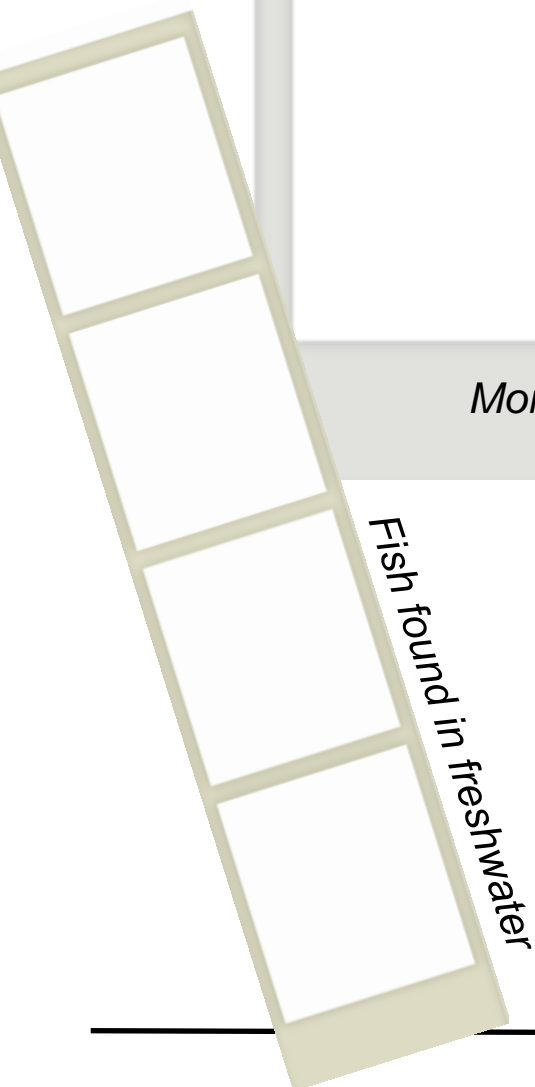
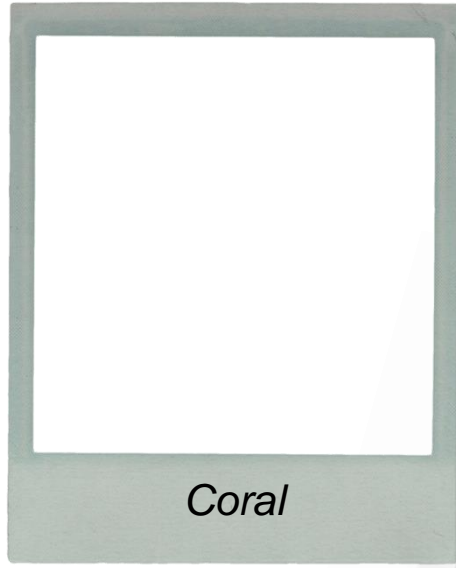
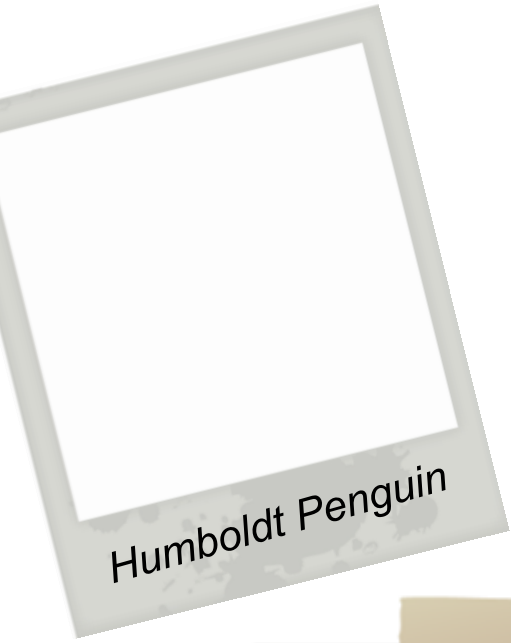
Optional: If the group has actual cameras, have them all select their favourite photo from their activity and see if they can capture it using their real camera/s.

Optional: for an extended activity, hand out small bits of card to each pupil. Explain that they are going to process the photos they took with their eyes. Have them select their favourite image they photographed (real or with just their eyes) and have them draw the picture on the card, just like a photo.

At the Zoo: Draw an adaptation the animals have that helps them move in the water.



At the Zoo: Draw some of the animals that live in and around water.

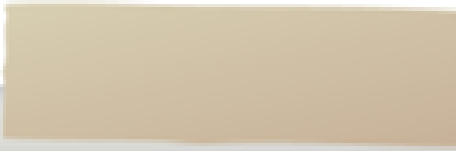


At the Zoo: Aquatic Animal Description

It is (circle one):

A freshwater animal

a saltwater animal



It eats:

What colour is it?:

Which water habitat
does it live in?

THE ANIMAL IS CALLED...

A cool adaptation it has is: _____

Something very special about it is: _____

At the Zoo: Animal Close Look



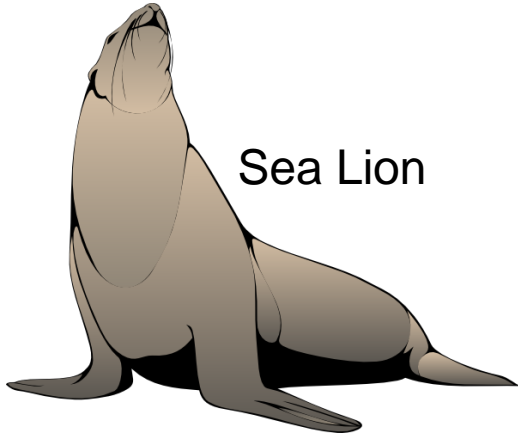
MY CHOSEN ANIMAL IS _____

If the animal was in the water, how did it move?:

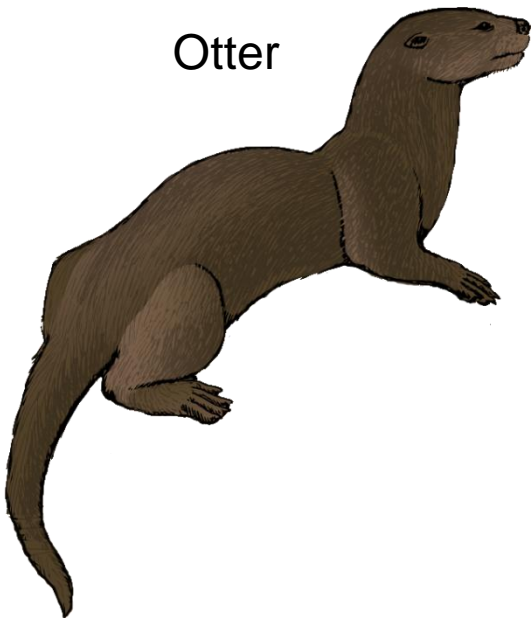
At the Zoo: Where do I Live

Look at these animals and draw what you think would be a good habitat for each of them.

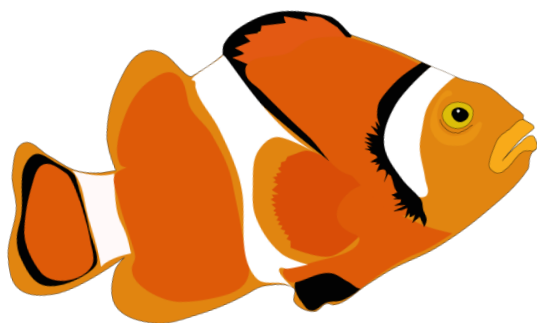
See the animals at the Zoo and check if your guess was correct.



Sea Lion



Otter



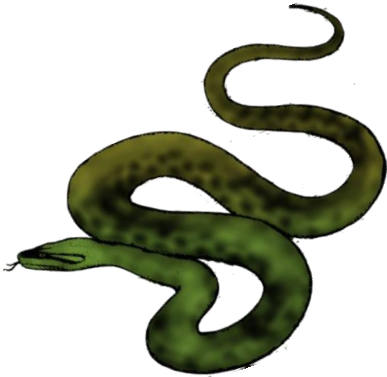
Clown fish



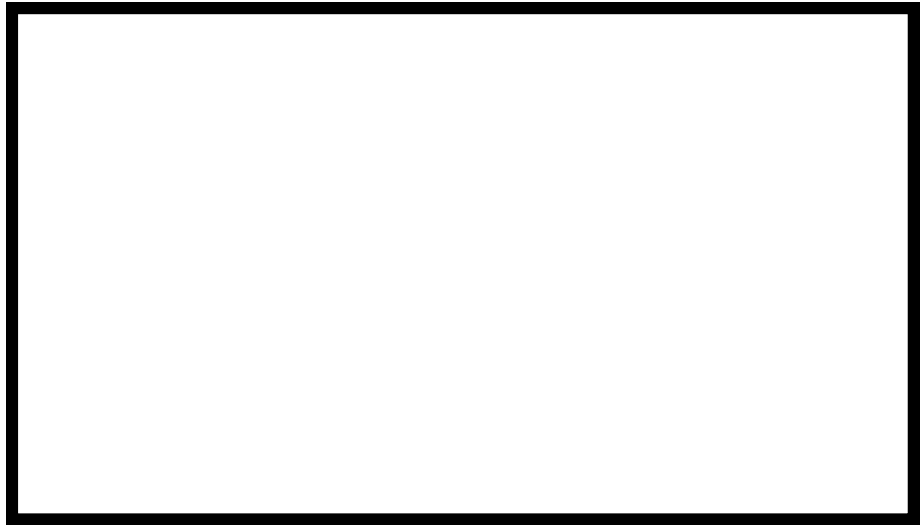
At the Zoo: Where do I Live

Look at these animals and draw what you think would be a good habitat for each of them.

See the animals at the Zoo and check if your guess was correct.



Anaconda



Lionfish



Chilean flamingo



At the Zoo: Animal Research

Name of animal: _____

Draw a picture of the animal on the back of this sheet

Type of animal (mammal, bird, etc.): _____

Size (record weight and height, can be an estimate): _____

Type of body covering (fur, feathers, scales, etc.): _____



Mark on the map where it lives in the wild

How does your animal eat and/or how does it get food?

What habitat does it live in? _____

How is it adapted to that habitat? _____

What is the future of your animal in the wild?

At the Zoo: Animal Observations

Name of animal: _____

Guess the weight of your animal: _____

Guess the length: _____

How does the animal move? (Legs, wings, fins, flippers?)

What is your animal covered with (scales, fur, etc.) _____

What colour is the body? _____

Any patterns or markings? _____

What colour are the eyes? _____

What size are the eyes? _____

.Describe it body shape: _____

How does its body shape help it when in the water? _____

At the Zoo: Who Eats Who

Fill in the chart with the names of animals you see at the zoo.

Next to the name write if it is a predator or prey animals.

What do you notice about the chart when it's done?

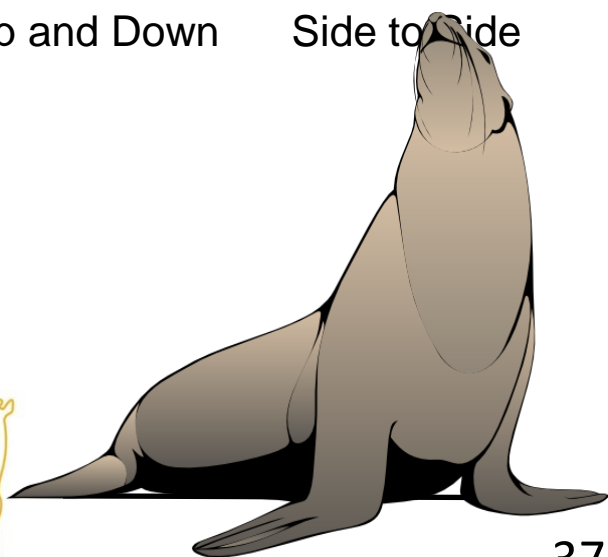
	Herbivore (plant-eater)	Carnivore (meat-eater)	Omnivore (eats plants and meat)
Mammal		Sea lion - predator	
Bird			
Reptile			
Amphibian			
Fish			

At the Zoo: Sea Lion Adaptations

Observe the sea lions at the zoo.

Circle the best answer to each observation.

1. Earholes	Yes	No
2. Ear lobes	Yes	No
3. Body weight	Thin	Fat
4. Fur	Long	Short
5. Whiskers	Long	Short
6. Teeth	Flat	Pointy
7. Body shape	Short and thin	Long and round
8. Intelligence	Smart	Not smart
9. Tusks	Yes	No
10. Breathes	Yes	No
11. Makes noise	Yes	No
12. Colour	Light	Dark
14. Nose	Tiny	Large
15. Rear flipper movement	Up and Down	Side to Side



At the Zoo: Aquatic Bird Vs Flying Bird

Observe the penguins and the lorikeets at the zoo.

For each description, write a P if it describes a penguin and a L if it describes a lorikeet (see beak for an example)

1. Beak	Pointed, grabbing	Short, crunching
2. Body Covering	Thick, fluffy feathers	Thinner feathers
3. Feet	Webbed	Not webbed
4. Tail	Short & fat	Long & skinny
5. Food	Seeds & fruit	Fish
6. Body Shape	Round & fat	Long and skinny
7. Walk	Quick & lively	Waddles
8. Wings	Flippers	Flight feathers
9. Purpose of Wings	Swimming	Flying
10. Colour	Dull colours	Bright colours

Penguins are adapted to: _____

Lorikeets are adapted to: _____

At the Zoo: Worlds Apart Maths

Visit the Worlds Apart Exhibit (next to the main café Umphafa).
See how many of these adaptations you can discover.

.Green anacondas jaws separate into 4 parts, so they can open their mouth extra wide.

How many green anacondas did you see? _____
How many jaw parts are there?

.Green anacondas are one of the biggest snakes in the world with a maximum size of at least 8 metres!

How many green anacondas did you see? _____
Assuming they all grew to maximum size, how long would all their length totalled together be?

Each piranha has a different numbers of teeth because they constantly loose them and grow new ones. On average, they have a minimum of 20 teeth.

How many piranha's in the tank? _____
What is the minimum number of piranha teeth?

Sloths move an average speed of 0.5m per hour. when climbing in the tree. However when the rainforest floods they often swim.

Sloths move 3 times faster when swimming. Estimate the width of the outdoor Worlds Apart corridor (between the glass enclosure walls).

How wide is the corridor _____m.
How long would it take a sloth to climb from one side all the way to the other side.
How long would it take the sloth to swim the same distance? (assuming it's moving at average speed)?

Green
anaconda
jaw parts

Metres of
green
anacondas

Piranha
teeth

Hours for
the sloth to
cross the
corridor

Hours for
the sloth to
swim the
same
distant

Post-Trip Classroom Ideas:

1. These are ideas to help teachers relate animals they have seen at the zoo to further learning about aquatic animals. Use these ideas as a starting point with or without the pre-made activities and worksheets on the next pages.
2. .Create a 'zoo guide book' of your school trip to Colchester Zoo. Have students write article about the animals they saw, and include pictures/sketches they made during the trip. Students should note adaptations for each animals
3. .Using their memory, pupils can create a map of the zoo. Include animals that they saw and areas they remember (including food, toilets, play areas, etc.). After drawing from memory compare their maps to an actual map of the zoo. What's different?
4. .Have the students design zoo enclosures for one of the aquatic animals they saw. Remind them to include features suitable for the animal's adaptations.
5. .Research different aquatic habitats and have students design an animal for that habitat.
6. .Play animal charades. Divide the class into teach and each team must act out an animal's movements. Use animals they observed at the Zoo, with a focus on how they are adapted to move in water.
7. .Look at how different aquatic animals use camouflage. Relate to aquatic animals seen at the zoo and see if they use camouflage.
8. .Explore the life of the octopus. This unique animal has some amazing adaptations. There are several online videos looking at their ability to change colour and also shows them problem solving better than some mammals.
9. .Create a poster which includes key points the students learned about adaptations whilst visiting the zoo.
10. .Have the students research aquatic habitats of one of the zoo animals.

Post-Trip Classroom Activities:

Create a Creature

Pupils will use their knowledge about animal adaptations to create a creature that could survive under water.

Time: 30+ minutes

Subjects: Science, Art

Materials Required: Potato for each pupil, toothpicks, craft supplies, glue, coloured paper, etc.

Explain to the pupil that they will be building an imaginary animal that is adapted to a to live in or around water. They will use the potato as the body for the animal and can stick in toothpicks/pipe-cleaners/paperclips for legs (if it has legs!). Encourage them to be create and add anything else than can thing of from other materials.

Remind them to think about:

- What does their animal eat? What food is available in its habitat?
- What does the animal use to move (flippers, fins etc)
- How does it camouflage itself?
- How does it avoid predators/hunt for prey?
- Does live in saltwater or freshwater?

After the pupils have finished construction, have each pupil name and describe their animal.

For a longer activity, after they are finished have pupils compare their creations to real animals that they saw at the Zoo.

Post-Trip Classroom Activities:

Animal Poetry

Pupils use their knowledge of animals to write poetry.

Time: 15-30 minutes

Subjects: Literacy

Materials Required: None

Introduce the pupils to different forms of poetry, for example, haiku, cinquain, and acrostic. Show them the example poems, by writing them on the board. After the pupils are familiar with the concept, they should choose an animal that they saw at the zoo. Using their memory and imagination they can try and write poetry about the animals.

Haiku

Originating in Japan, the haiku is three line of poetry, following the pattern of five syllables, seven syllables and ending with five syllables. The lines do not need to rhyme. For example:

Sea lion makes a splash	(five syllables)
Fast and darting swimming past	(seven syllables)
Noisy and smelly	(five syllables)

Cinquain

Cinquain poems have five lines and have specific pattern. Word cinquains are based on the number of words in a line. For example:

Penguin	(one word—an animal)
Bold and playful	(two words that describe it)
Dives deep down	(three words expressing action)
Swims with joyful freedom	(four words explain how you feel about it)
Amazing	(sum up with one word)

Acrostic

These are poems where the first letter (or syllable or word, etc.) spell out a word or message. The easiest is spelling out the name of an animals (for older children try hiding messages).

For example:

From fresh to saltwater you'll find them
In rivers they fight the currents
Seas they move with the waves
Hunted and the hunters often both they are

Post-Trip Classroom Activities:

Where in the World

Pupils learn where different animals live.

Time: 20-30 minutes

Subjects: Science, Geography

Materials Required: Animal map

Before this activity, learn about different animals and habitats. Pupils should also be familiar with the names of the continents.

Hand out copies of the map to each pupils. Have the pupils colour in the map showing the oceans and major sources of fresh water (the Nile, lake Victoria etc) Next have the pupils draw a line connecting the animals to where they think the animal lives based on its appearance.

After guessing, have the pupils research where the animals live and found out exactly where each animal is from (older pupils could research what country they live in). Using this researched information have the pupils colour and label another map.

Compare the differences or similarities between their guess map and the research map. Discuss what they guessed wrong and why they think they guessed wrong.

The pupils' job is to draw a line connecting the animal to where they think the animal lives based on it's appearance. To help, have them look at other pic

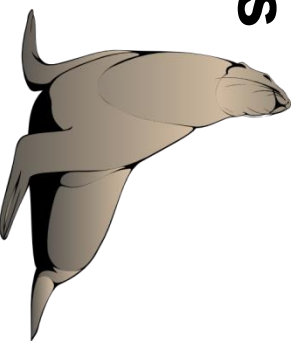
Hand out copies of the map to each pupil. The pupils job is to draw a line connecting the animals to where they live. If the pupils have already learned about all the animals, they can label the animals as well (see earlier in the pack for more detailed information about the animals and where they live).

To make it more of an art activity, print to copies of the map for each pupil. Have them cut out the animals shapes and glue them onto the places where they live.

Animal Adaptations



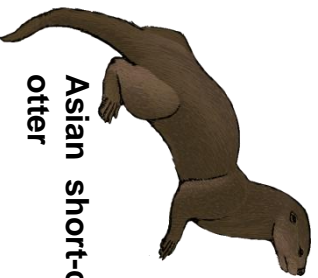
Maroon clownfish



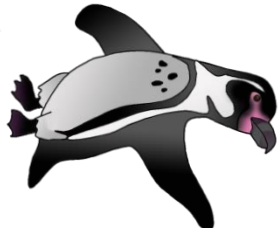
Patagonian Sea Lion



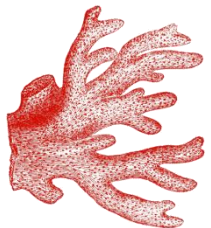
Chilean Flamingo



Asian short-clawed otter



Humboldt Penguin



Cabbage leather coral



Lombardo's Cichlid

Post-Trip Classroom Activities:

Food Webs

The reinforces concepts about interdependency of animals in habitats

Time: 10 minutes

Subjects: Science

Materials Required: Yarn, pictures of different aquatic plants and animals

Have the pupils form a circle. Get them all to name plants and animals that live in either freshwater or saltwater. Hand out pictures of different plants and animals, or have the pupils remember their answers. Give the ball of yarn to one of the plants e.g. zooplankton. Then ask if any of the animals would eat the zooplankton. Find an animal, e.g. coral, and hand the ball of yarn to the coral (the zooplankton should keep holding the end). Now ask what would connect to the coral, possibly a fish that lives in the coral. Then pass yarn to predator, e.g. shark, that would eat that fish. Hand the ball of yarn to a shark.

Continue connection the pupils with the yarn representing the relationship between the plants and animals. Consider other connections as well, e.g. this fish lays eggs what would eat the eggs? This animal poops, what might use the poop? etc. Continue until all the pupils are connected together by the yarn. It should now look like a messy, interconnected web.

Investigate what happens to food webs if one element is removed. For example, ask what would happen if the coral reef was killed due to pollution? Have the pupil who is the coral let go of the yarn. Now, any other pupil who's yarn is loose (they were connected to the coral) should also let go. Use this to reinforce discussions how everything, plant and animal, is connected.

We hope you enjoyed your trip to



Learning about

**Water
Animals**

