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# BORNEO WILDLIFE CHAPTER

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1STOPBORNEO WILDLIFE







Welcome teachers, students, parents, general public alike. We have been doing conservation and educational work on Borneo since 2012. We have noticed that in the local school curriculum there is nothing much about local wildlife. We see that the young people and general public on Borneo knows more about lions, tigers and macaws than our own local animals.

The main objective of this educational material and chapter is to educate the younger generation and the general public of Borneo about local wildlife and certain issues pertaining to them. We hope you will enjoy this chapter and wish all school teachers to implement this chapter as part of their teaching. We are happy to collaborate with you in any way we can.

For questions and inquiries please email us at [Istopborneo@gmail.com](mailto:Istopborneo@gmail.com)

This chapter has information on some of the mammals, amphibians, reptiles, birds, marine animals, plants, and insects of Borneo. Enjoy learning more about Borneo!



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# MAMMALS

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# FUN FACTS ABOUT MAMMALS!

**1**

## **GIVE BIRTH**

They give birth to live babies and provide them with milk

**2**

## **WARM-BLOODED**

Their body temperature is kept above that of their surroundings.

**3**

## **VERTEBRATES**

That also means they have a backbone!

**4**

## **HAVE HAIR OR FUR**

**5**

## **BREATHE THROUGH LUNGS**

**Kingdom: Animalia**

**Phylum: Chordata**

**Class: Mammalia**



# ORANGUTANS

## PHYSICAL DESCRIPTION

In Malay, the word “orang” means “person” and “utan” is derived from “hutan”, and the word itself means “forest”. Thus, the name orangutan directly translates to “person of the forest”.

**Orangutans are apes covered in shaggy reddish fur.**

They also have grasping hands and feet that help them to swing from tree to tree effortlessly. Unlike humans, the arms of the orangutans are longer and stronger than their legs and can also reach 2 metres in length!

## INTERESTING FACTS

**This particular mammal lives in primary and secondary forests.**

**They usually travel by moving from one tree to another and avoid going to the ground.**

**When they do get down, they move on all fours, with clenched fists.**

**When it is time to sleep at night, they build nest out of plant materials. They can make a new nest everyday.**

## LIFE CYCLE



## DIET

**Around 60% of the orangutan's diet consists of fruits, such as durian, jackfruits, lychees, mangosteens, mangoes, and figs.**

**Besides fruit, they also eat young leaves, shoots, insects, soil, tree bark, and occasionally eggs and small vertebrates. They drink water from water holes.**

# PANGOLINS

## PHYSICAL DESCRIPTION

A pangolin is a mammal covered in scales, which makes it look more like a reptile instead. There are 8 species of pangolins in the world but in Borneo we have only one species, which is the Sunda Pangolin.

The scales are made up of a substance known as keratin, similar to that of our hair. That accounts for about 20% of their body weight.

It has a small, conical head and a long, broad tail.

The Sunda Pangolin weighs between 5-16kg and has been recorded all over Borneo.

It does not have any teeth to chew its prey but it has a special stomach containing keratinous spines to grind the food with the help of tiny stones it ingests.

## INTERESTING FACTS

Pangolins are creatures of the night! These scaly anteaters remain in their burrows during the day and only come out at night to hunt.

Using their keen sense of smell, they can easily locate termite and ant nests.

They then use their claws to dig the insects from their mounds and use their incredibly long, sticky tongue to slurp up the insects.







# THE PANGOLIN PROJECT



1StopBorneo  
Wildlife



@wildlifeclub

- #RESCUES
- #RESEARCH
- #SUSTAINABILITY
- #POACHERTURNTOGUIDE
- #CONSERVATIONTOURISM



# SLOW LORISES

Slow lorises are mammals in the Prosimian group which consists of smaller primates like Lemurs, Bush-babies, and Tarsiers.

Slow lorises are nocturnal, meaning that they are active at night and sleep during the day.

At night, they travel long distances in search of food.

These mammals are arboreal meaning that they spend their lives living in trees.

These little critters are very cute, which is a big problem for them as many people want to keep them as pets.

## ATTENTION!!

They have a toxic bite! So they are not suitable as pets. They use this for defence in the wild and also to hunt insects.

Keeping this cute creature as a pet at home is extremely harmful as they are uncomfortable in brightly lit indoor areas due to their nocturnal behaviour. Common foods fed to them at home are also not suitable as it is not their natural diet.

Please report if you know someone who keeps one as a pet at home!





# ELEPHANTS

## PHYSICAL DESCRIPTION

The Borneo Elephants are the smallest elephants in the world. However, they are still the biggest land mammals on Borneo as they can weigh 2-3 tons.

Other than the size difference, the majestic Borneo elephant can be distinguished from other elephant species by its relatively longer tail, straighter tusks, and smaller face, which is said to be baby-like.



Photo by Shavez Cheema

## INTERESTING FACTS

The trunk is an important feature of the elephant. Elephants are able to use their trunk as an arm to pick up objects, drink water, and bathe. They also use it to trumpet out a warning call.

Elephants have their own social structure where females and calves stay in a group led by a matriarch, while adult males are solitary or group together with a few other males to form a bachelor group.



Photo by Bryan Gibz

# LEOPARD CATS

The leopard cat is one of the five species of wild cats on Borneo.

They are threatened by poaching as people want to keep them as pets because they are so cute.

Other than the forest, leopard cats are also found in plantation where they hunt small animals like rats. Do not keep them as pets as they are important to help control pests in their natural habitat!



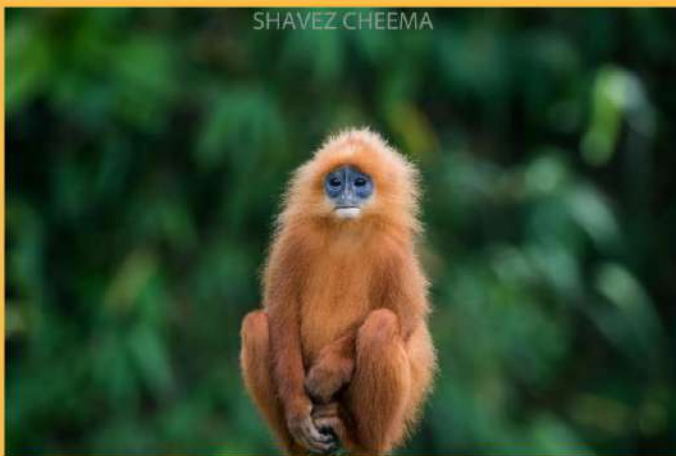
Photo by Frank Li



## RED LEAF MONKEYS

The Red Leaf Monkey is an endemic primate of Borneo. Endemic means that the species is found only in a particular geographical location.

They usually eat leaves and unripe fruits.



SHAVEZ CHEEMA

Photo by Shavez Cheema

## SUNDA STINK BADGERS

Sunda Stink Badgers are locally known as "teludu".

Interestingly, they are commonly spotted around plantations as they are tolerant to habitat disturbance and can survive on a variety of food.

As the name implies, the Sunda Stink Badger is known to have a very strong odour.



Photo by Mike Gordon

# CLOUDED LEOPARDS

There are less than 10,000 Clouded Leopards on Borneo.

They live in the rainforest, but they are losing their habitat because of deforestation.

They are expert tree climbers!

They feed on rodents, like rats and moon rats, and deer.



Photo by 1StopBorneo Wildlife

They are rare, therefore, there is not a lot of information about them.

Clouded Leopards are nocturnal. That means they sleep during the day and are awake at night.

They are also vulnerable because poachers like to hunt them.



Photo by Michael Gordon



# MAMMALS

# LET'S TEST YOUR UNDERSTANDING!

List down 4 characteristics of mammals:

- 1)
- 2)
- 3)
- 4)

How heavy is the Sunda Pangolin?

- A) 5-16 KG
- B) 8-16 KG
- C) 12-28 KG
- D) 5-14 KG

What is the meaning of arboreal? Choose the animal that is arboreal.

- 1) Arboreal means
- 2) The arboreal animal is:
  - a) the Borneo Elephant
  - b) the Slow loris
  - c) the Sunda Stink Badger

I usually use my trunk as an arm to pick up objects, drink water, and bath. I also use it to trumpet out a warning call. Who am I?

- A) Proboscis monkey
- B) Slow loris
- C) Pangolin
- D) Orang utan
- E) Elephant

In your opinion, should we keep the slow loris as a pet? State your reason.



## Activity!

*Go explore your own garden or your neighbourhood!*

Try to find if there are any **squirrels** around. Observe one and record your observation of it

**Note down:**

- What time did you see it?
- How long did you observe it?
- What colour is it?
- What was it doing?
- Was it bothered by you?





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# BIRDS

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# FUN FACTS ABOUT BIRDS!



In Borneo, we have:

**8 HORNBILL SPECIES**

**18 WOODPECKER SPECIES**

**10 PITTA SPECIES**



Photo by Wong Tsu Shi

**Did you know that the Borneo Bristlehead is a unique bird found only in Borneo and nowhere else so people from all over the world come to see this species.**

## Other interesting bird facts that you may not know about:

**Over 600 species of birds have been recorded on Borneo.**

**Kinabalu Park has many mountain endemics. Endemic means animals or plants found only in that locality.**

**Owls can turn their heads almost 360 degrees but cannot move their eyes.**

**Did you know that Lesser Adjutant is perhaps the biggest flying bird on Borneo?!**

**The Oriental Darter is also known as the snake bird because of its long neck. When it pokes its head out of the water, or swims to hunt fish, it looks like a snake!**

**Kingdom: Animalia**

**Phylum: Chordata**

**Class: Aves**



# HORNBILLS



Can be found in tropical and subtropical Africa, Asia and Melanesia.

Many hornbill species, like the Rhinoceros Hornbills, have a casque on their beak, which can be a very conspicuous.

Borneo is home to 8 species of hornbills. Southeast Asia has 23 species in total.

Because their tongues are too short, they toss their food from the tip of their beaks back into their throats while eating.

Hornbills are distinctive from other birds due to their massive "double-storied" bill that are used to fight, preen, feed, and construct nests.

Hornbills are primarily frugivorous with figs predominant in their diet, but they also eat small animals like insects, snakes, and even bats.

They are considered to be important seed dispersers in the forest as they excrete the seeds far away from the mother tree.



# HORNBILLS



Hornbills pair for life. The male hornbill begins courting the female by bringing her food a month or more before mating. The female will enter a hole in a tree to build a nest. The pair will then spend days plastering up the hole with the female's droppings, with the female on the inside and the male on the outside, so that she is trapped inside the hole whilst her eggs are laid, hatched and become young birds.

Hornbills are a cultural symbol amongst many indigenous tribes in Sarawak and Kalimantan. The Rhinoceros hornbill locally known as the Kenyalang, represents Sarawak's emblem.

The indigenous Dayak community has a lot of traditional beliefs about hornbills. Hornbills are seen as guardian spirits, omens of good luck, and signs of strength and purity. The hornbill elements are incorporated into their arts, dances, carvings, and ceremonial attire.

Hunting has contributed to the decline of the hornbill population so that they are becoming extinct locally. This is made worse due to the bird's slow breeding rate and low population density. 5 out of the 8 hornbill species are listed as "Near Threatened" on IUCN's Red List of Threatened Species.

These birds have a long lifespan and require sufficient large trees with holes to breed. Keeping enough big trees in a forest is important to maintain the hornbill population.



# PITTAS



Photo by Mike Gordon

The pitta bird is characterized by its roundish body with long strong legs and a short stout tail. The Blue-banded Pitta, Bornean Banded Pitta, and Fairy Pitta are among the most colourful species.

It is a diurnal (daytime) bird that dwells in the darker undergrowth of the forest and usually roams around its territory alone (solitary).

Pitta birds have specific calls and also respond to calls. This weakness is sometimes used by poachers to call them out in order to catch them.

Pitta birds love eating earthworms, snails, and insects. They use their beaks to pick away leaves to find any hidden prey on the ground. They will also dig in order to locate earthworms.



# KINGFISHERS

Kingfishers have a very distinctive body profile - short legs, stubby tail, and a pointed, broad, long beak on a large head to help them dive through water to snatch prey.



Stork-billed  
Kingfisher

They see well both in air and under water with specially fitted egg-shaped lenses in their eyes, which help them to focus in the two different environments.

Most Kingfishers are found perching near bodies of water which gives the impression that they are waiting for fish, hence the name. In fact, kingfisher also feed a lot on insects and lizards.

The Stork-billed Kingfisher is the largest kingfisher on Borneo. The Bornean Banded Kingfisher is another beautiful kingfisher which is endemic to Borneo and exhibits sexual dimorphism, which means the males and females of the species look different.

The kingfisher was once included in Sabah's coat of arms.



# ARGUS PHEASANTS

Photo by Shavez Cheema

The Argus Pheasant is the largest species among the pheasants of Borneo. The males can measure up to 2 meters in length with their long tail feathers.



These pheasants prefer primary rainforests and are less common in secondary forests.

They perform a remarkable **breeding ritual!** The male clears an open spot on the forest floor and prepares a dancing ground. He announces himself with loud calls to attract females, then he dances before her with his wings spread into two enormous fans, revealing hundreds of flashy "eye-spots".

It searches on the forest floors for fallen fruit and small invertebrates in the early mornings and evenings.

The hen lays only two eggs per clutch.

The incredibly loud calls of the Argus Pheasant are often heard early in the morning from as far as a kilometer away. The call is a double note "kow wow" which is clear and explosive. The male pheasants like calling from a higher hill or ridge so that their calls travel further.



# TROGONS



**Whitehead's trogon**  
Photo by Chun Xing Wong

There are six species of Trogons in Borneo but the Whitehead's Trogon is endemic to Borneo. This species is named after John Whitehead, an English explorer and naturalist who became the first European to reach the highest point of Mount Kinabalu.

The Whitehead's Trogon is sadly near threatened because it is only found in a very small range of montane forest, from Mt Kinabalu to Usun Apau and Kayan Mentarang in the south.

Trogons are often seen in pairs, so it is easy to identify the sexes. However, the Orange-breasted Trogons are an exception, where the males do not have the bright red plumage, so the difference between the sexes is not obvious (no sexual dimorphism).

Trogon are stunning birds which are sometimes spotted easily in the forest with their obvious, bright red chests. However, only the males have this bright red colour while the females have duller colours.

All trogon species feed on insects and occasionally on fruits. Several species are sympatric, where they share the same habitat, so they avoid competition by foraging at different levels in the forests.



# SHAMAS



**White-crowned Shama**  
Photo by Subki

"There are three species of birds in Borneo called the Shamas. White-crowned Shama and White-rumped Shama are the most popular birds as they are often caught to be sold as songbirds

Magpie Robins are related to the Shamas and these birds are quite common around gardens. They are able to sing melodious songs like the shamas, which makes them popular as caged birds and for songbird competitions

The White-crowned Shama is endemic to Sabah and Kalimantan. There is also a subspecies called the Maratua Shama which is interestingly restricted only to the small Maratua Island of Kalimantan.

Shamas are mainly insectivorous in the wild as they feed mostly on insects.

Shamas are locally called "Murai Batu" or "Burung Kopi Susu". The local demand for keeping these birds in cages is an old tradition to show social status and for cultural practices. Sadly, the songbird trade is not stopping and is now becoming complicated with the usage of bird calls by poachers and the issue of songbird licenses.



# BARBETS



Photo by Chun Xing Wong

There are 9 species of Barbets in Borneo and amazingly, more than half of them are endemics.

All the barbets are green in colour with some blue, black, and red markings on their heads except the Bornean Brown Barbet which is brownish.

Barbets sing all day and hide well in the canopy. Their calls are created from a pair of large sacs on the sides of the throat.

# BIRDS

## LET'S TEST YOUR UNDERSTANDING!

What does the Pitta love to eat?

- 1)
- 2)
- 3)

Which of these birds are endemic to Borneo?

- A) Blue-winged Pitta
- B) White-crowned Shama
- C) Argus Pheasant
- D) Whitehead's Trogon
- E) Bornean Barbet

Write about the remarkable breeding ritual techniques of Argus Pheasant.

I have a long broad beak and I can see well underwater. Who am I?

- A) Pitta
- B) Kingfisher
- C) Hornbills
- D) Argus Pheasant
- E) Whitehead's Trogon

Tell us why Hornbills are important to the ecosystem?



## Activity!

Go explore your own garden or your neighborhood!

Record down the types of **birds** you see.

**Note down:**

- What time do you see them?
- What are they eating?
- Are they singing?
- Do they flock together?





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# AMPHIBIANS

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# FUN FACT ABOUT AMPHIBIAN!

**1** A GROUP OF FROGS IS KNOWN AS AN "ARMY"

**2** JUMPING ABILITY

Some frogs can jump 20 times the length of their own body, that is equivalent to a human jumping 30 meters.

**3** TADPOLES

Tadpoles love eating mosquito larvae.

**4** TYPES OF FROGS

There are flying frogs, frogs which only live in rivers, frogs which live underground!

**5** FUNCTION OF THE EYEBALLS?

Frogs use their eyeballs to help swallow food and when they push down their eyeballs, the food is also pushed down their throats.

**Kingdom: Animalia**

**Phylum: Chordata**

**Class: Amphibia**



# HORNED FROGS

They have broad heads and triangular horns.

They need streams for their tadpoles.



**Locations:**  
Tawau Hills National Park,  
Gunung Kinabalu Park,  
Kubah National Park.



They are capable of swallowing large prey such as large cockroaches, snails, and possibly other frogs.



Malayan Horned Frog  
Photo by Shavez Cheema

# WALLACE'S FLYING FROGS

**They are a flying frog of Borneo.**

**Their live high up in the tree canopy of primary lowland rainforests.**

**It comes down from the trees to reproduce in forest ponds.**



**They are similar to Borneo Flying Frog. They have emerald green body colour, big eyes, and their hands and feet are huge and appear oversized.**



**Photo by Shavez Cheema**



# BLACK SPOTTED ROCK FROGS



They are also known as 'splash frogs'.



They are known for their foot flagging behavior. Signals are given to other individuals.



They live in fast-flowing, clear, rocky streams in lowland or hilly rainforests in Borneo.



Photo by Shavez Cheema

# BUSH FROGS



**They have  
excellent  
camouflage.**



**They  
spend  
most of  
the time  
hidden in  
bushes.**



**They  
breed in  
small  
ponds.**



**Mossy Bush Frog  
Photo by Shavez Cheema**



# GIANT RIVER TOAD

The Giant River Toad is the largest native toad species on Borneo. It can get as big as a small rabbit.

The toads secretes large amounts of milky toxic poison from their warts when harrassed.

They are good swimmers; strong legs make them a good jumpers as well.

The Rough River Toad is another toad which looks similar to the Giant River Toad except much smaller in size.



They are hunted for food in some areas: the toad is skinned, washed, and cooked.



Photo by Bud Chapman



**White Lipped Frog**



**Brown Bullfrog**



**Kuhls Creek Frog**



**File Eared Frog**



# LET'S TEST YOUR UNDERSTANDING!

List down the characteristics of Wallace's Flying Frog:

- 1)
- 2)
- 3)

Where does the Black Spotted Rock Frog live?

What is the meaning of camouflage? List down amphibians that have camouflage.

1) Camouflage means

2) Amphibians that have camouflage are:

- 1)
- 2)
- 3)

Tell us why are frogs important in the ecosystem?

Giant River Toads are usually being hunted in some areas for food. In your opinion, do you think it is good for the ecosystem if this animal continues to be hunted? Why?



## Activity!

*Go explore your own garden or your neighbourhood!*

*Find out species of frogs you have in your garden?*

**Note down:**

*What do you think they eat?  
What do you think eats them?  
What did you see them do?*



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# REPTILES

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# FUN FACT ABOUT REPTILES!

**1**

## HOW MANY SPECIES ON EARTH?

There are more than 8000 species and they live on every continent except Antarctica because it's too cold!

Borneo has over 150 species of snakes.

**2**

## COLD-BLOODED

They do not necessarily have blood that is cold. They are ectothermic, which means they obtain their body heat from external sources because they are unable to regulate their body temperature internally as humans do.

**3**

## HOW DO THEY HUNT FOR FOOD?

Snakes and lizard flick their tongues in the air in order to capture scent particles.

**4**

## RETICULATED PYTHON

The reticulated python of Borneo can grow up to 30 feet long!

**5**

## TYPES OF SNAKES ON BORNEO!

There are snail-eating snakes, egg-eating snakes, worm-eating snakes, rat-eating snakes and snake-eating snakes on Borneo!

**Kingdom: Animalia**

**Phylum: Chordata**

**Class: Reptilia**

# FLYING SNAKES

Flying snakes have the unique capability to fly and glide up to 100 metres from one tree to another!

It is known as the Paradise Tree Snake and in Murut Timugon language it is known as Kukuo Ra'laa.

It changes shape as it begins to glide, ribs spreading and body flattening and swimming through the air like a water snake crossing a pond.

They can be found in forests in Borneo.

Their body will become as flat as a ribbon while gliding.



They prey upon lizards, rodents, frogs, birds and bats.

This species is considered mildly venomous.



# MONITOR LIZARDS

They are moderate or large in size with thick skin containing numerous rows of small, rounded scales circling the body.

They have long forked tongues, and are cold-blooded.

They are carnivorous and feed on eggs, smaller reptiles, fish, birds and small mammals.



They can cause serious injury with their long, sharp claws, strong tail and sharp teeth.

They are usually found near wet areas, and can swim strongly when disturbed.

# PYTHONS

There are two species of pythons in Borneo, the Reticulated Python and the Bornean Short-tailed Python.

They are non-venomous, and can only be found in Borneo.

Their head is long and broad, wider than the neck. The tail is short and tapers sharply.

The females are generally larger than males.



Reticulated python

Some pythons can grow up to 30 feet!

They are found at lower elevations, on poorly drained flood plains, or on the edges of swampy areas.



Short-tailed python

ALL pythons are expert swimmers.

Pythons are often hunted for their skin and meat.

The small pythons climb in trees while larger pythons tend to stay on the ground.

They feed on small to medium-sized birds and mammals, such as rats and chickens.



# MANGROVE SNAKES

The Mangrove Snake also known as the Yellow-ringed Cat Snake.

It is a venomous snake.

It occurs mainly in mangroves or riverine habitats.

By day it lies motionless on overhanging branches, but at night becomes active, coming to the ground to hunt.

They feed on other vertebrates including rodents, small birds and their eggs, frogs, bats and sometimes other snakes



It is also a great swimmer!

# PIT VIPERS

**Bornean Keeled Pit Vipers** are found in habitats similar to those of the Wagler's Pit Viper. These include lowland primary or mature secondary forest, as well as riverine and coastal forests.

This is a venomous snake that can sense heat using the pits on the sides of the head.

It is exclusively arboreal, and is usually found at a range of heights, from low vegetation to mid-canopy levels.

This particular pit viper feeds on birds and arboreal rodents.

Juvenile and adult males of this species are distinguished by their vibrant green upperside, while their belly is yellowish-green. Males are also patterned with a number of thin, pale, bi-coloured bars. A red and white stripe runs across each eye to the back of the head.



SHAVEZ CHEEMA

It is considered to be **ENDEMIC** to Borneo.

Adult females, on the other hand, tend to be cream-coloured and patterned with broken bands of green, blue and turquoise. There is a thick stripe on either side of the head.



# ANGLE-HEAD LIZARDS

Anglehead Lizards are also known as Agamid Lizards. The Borneo Anglehead and the Great Anglehead Lizards are among the more frequently encountered species in the forests of Borneo.

Their tails are twice the length of their body

Irregular banding is present on the anterior part of the lizard's tail

Female Anglehead Lizards are grey with green blotches. Their spiny crests are smaller than those on the males.

Males of this species are brown in colour. They have pale flecks and are paler ventrally (on their bellies). They have a comb-like crest of spines that extends along the vertebral line from the neck to the base of the tail.

This species inhabits lowland primary rainforest below 700 meters in elevation. However, on Mount Kinabalu, it is found to have occurred at higher elevations.

Both sexes have a throat pouch that is pale.



They are typically found resting on a branch in the shade, clinging to saplings or lianas.

# SALTWATER CROCODILES

The Saltwater Crocodile is the largest of the 23 species of crocodiles in the world.

They can live up to 70 years of age.

They are considered aquatic animals as they rarely spend time on land.

This particular species can reach up to 6 metres in length and weighs about 450 KG.

They are able to cope with high salinity due to the presence of salt glands in the tongue as well as their relatively impermeable skin.

They can be found in coastal brackish water habitats and tidal sections of rivers.





# TORTOISES

Box Turtles have a black or dark brown carapace, while their skin and limbs are black or faded black in colour. A light yellow streaking is present on their neck and face.



Males usually have a slightly concave plastron, while females have a flat plastron. (Plastron is the part the shell which is the underbelly of the turtle).

Asian box turtles range in size depending on the geographical location. Smaller subspecies of this creature measure from 5 inches long while larger subspecies measure from 9 to 12 inches in length.

Box Turtles are omnivores. That means they eat plants and meat. They feed on invertebrates, like insects, slugs, worms and snails. They also eat eggs, fruit and plants.

# REPTILES

# LET'S TEST YOUR UNDERSTANDING!

List some snake species you know on Borneo

- 1)
- 2)
- 3)
- 4)
- 5)

Which of the following are venomous? You may choose more than one.

- A) Python
- B) Mangrove snake
- C) Flying snake
- D) Bornean Keeled Pit Viper
- E) Borneo Anglehead lizard

List the different types of food eaten by Box Turtles.

- 1)
- 2)
- 3)
- 4)
- 5)

My body will become as flat as a ribbon while gliding. Who am I?

- A) Python
- B) Mangrove snake
- C) Flying snake
- D) Bornean Keeled Pit Viper
- E) Borneo Anglehead lizard

Why is the Saltwater Crocodile able to cope with high salinity environments?



## Activity!

Go explore your own garden or your neighbourhood!

Observe any **monitor lizards/biawak** near your house/school area. Don't scare them away.

**Note down:**

What was they doing?

How long did you see they for?

Do you think they are important in the ecosystem?





---

# INSECTS

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# FUN FACT ABOUT INSECTS!

**Borneo is the kingdom of bugs! Did you know that each rainforest tree supports up to 1,000 species of insects?**

**1**

## **SPIDERS**

Spiders are NOT insects!

**2**

## **BEEES**

Bees are found on every continent except for Antarctica.

**3**

## **ANTS**

Ants leave trails and communicate with each other using pheromones as chemical signals.

**4**

## **CICADAS**

Some cicadas are able to make sounds as loud as a thunderclap (120 dB).

**5**

## **NUMBER OF INSECTS**

The number of insect species in the world is believed to range between six and ten million.

**Kingdom: Animalia**

**Phylum: Arthropoda**

**Class: Insecta**



# BEETLES

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Beetles are  
have a pair of  
hard wing  
cases.

They are very  
diverse: they come  
in all kinds of shapes  
and sizes, colours  
and patterns.

Many are  
only active  
at night.

They can be  
found all  
over Borneo.



# MANTISES

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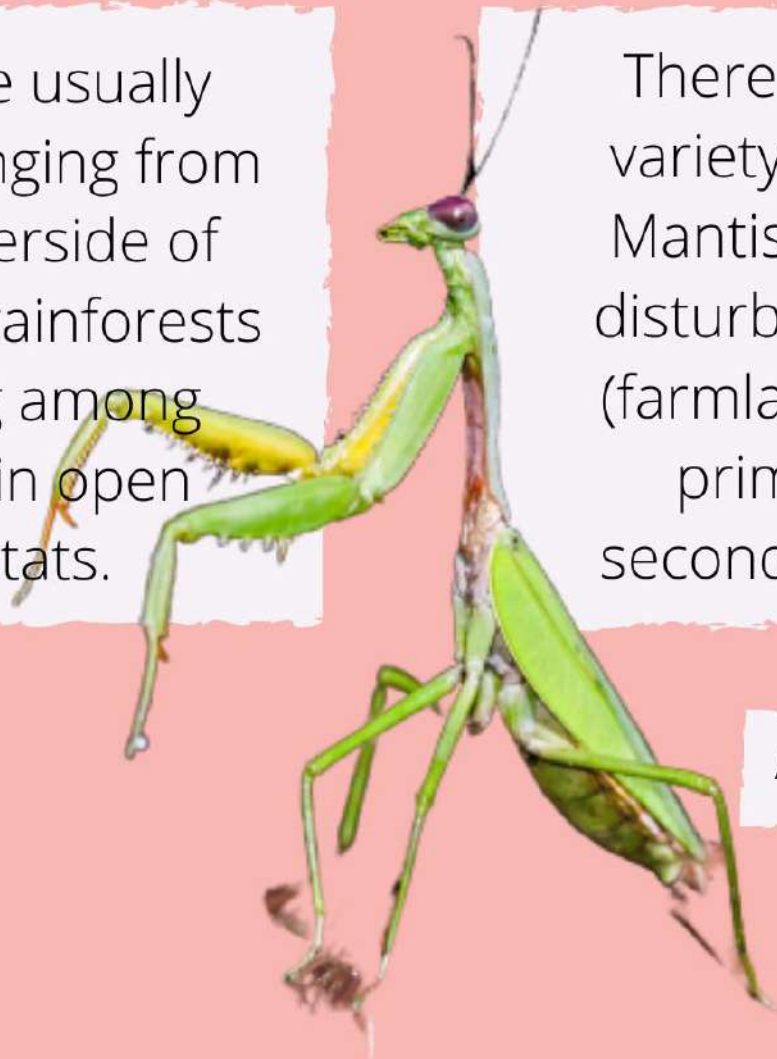


Mantises are known as ambush hunters. They are predatory insects.

Their body structure is in the shape of sticks, bark, dead leaves, flowers and many other types of camouflage.

They are usually found hanging from the underside of leaves in rainforests or living among weeds in open habitats.

There is a larger variety of Praying Mantis species in disturbed habitats (farmland) than in primary and secondary forests



**Asian Giant Mantis**



# ANTS



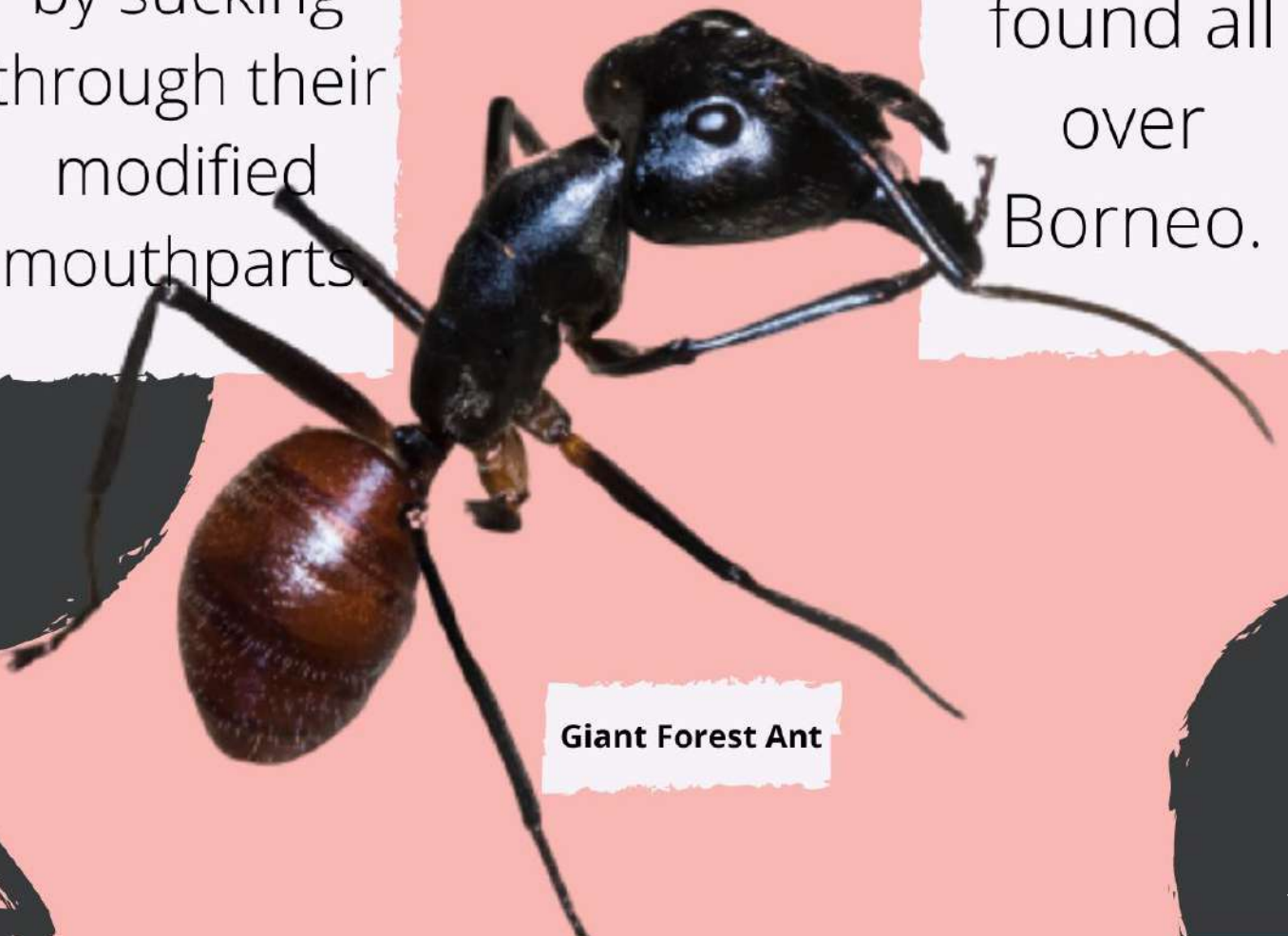
Ants are one of the most abundant and diverse animal groups in tropical ecosystems.

Most species have stationary nests.

They are very small in size, with two antennae.

They feed by sucking through their modified mouthparts.

Can be found all over Borneo.



Giant Forest Ant

# SPIDERS

Spiders are not insects, but arachnids as they have 8 legs.

Most eat insects and other spiders.

Some of the larger spiders also prey on birds and other larger prey.

Most spiders spin webs to trap prey.

They are found everywhere.



**A mother Huntsman Spider carrying an egg sac.**





**Atlas Moth**



**Brown Owlet Moth**  
(*Ischyja hemiphaea*)



**Leaf Lappet Moth**  
(*Gastropacha leopoldi*)





**Picture-winged Leaf Moth**  
*(Glanycus coendersi)*



**Sphynx Moth**  
*(Marumba juvencus)*



**Common Tree Nymph**  
*(Idea stollii)*



# INSECTS

## LET'S TEST YOUR UNDERSTANDING!

I am characterized by a pair of hard wings cases. Who am I?

- A) Bee
- B) Ant
- C) Spider
- D) Beetle
- E) Mantis

Which of the following is NOT an insect?

- A) Bee
- B) Ant
- C) Spider
- D) Beetle
- E) Mantis

Which of the following insects communicate with each other by using pheromones as chemical signals?

- A) Bee
- B) Ant
- C) Cicadas
- D) Beetle
- E) Mantis

I am known as an ambush hunter and a predator of other insects. Who am I?

- A) Bee
- B) Ant
- C) Spider
- D) Beetle
- E) Mantis

Mantis are able to do camouflage. Thus, their body structure can be in the shape of:

- 1)
- 2)
- 3)
- 4)



## Activity!

*Go explore your own garden or your neighbourhood!*

*Find out the species of butterflies that you have in your garden?*

*Note down:*

*What do you think they eat?  
What do you think eats them?  
What did you see them do?*



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# MARINE LIFE

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# FUN FACT ABOUT THE SEA!

**Borneo is located in the extreme southwestern part of the Pacific Ocean. It is the third largest island in the world, after Greenland and New Guinea.**

**1**

## **EARTH'S SURFACE**

Around 70% of the Earth's surface is covered by OCEANS.

**2**

## **PACIFIC OCEAN**

The name "Pacific Ocean" is derived from the Latin name Tere Pacificum, which means "peaceful sea".

**3**

## **MARIANA TRENCH**

The deepest known area of the Earth's ocean is known as the Mariana Trench. Its deepest point in this area is 11KM.

**4**

## **WORLD OCEAN EXPLORED?**

Only 5% of the world's ocean have been explored so far.

**5**

## **EARTH'S MEGA MUSEUM**

The sea can also be described as Earth's Mega Museum. The remnants and artefacts in the ocean are MORE than that in all of the world's museum combined!



# DUGONGS

Dugongs are large, solid mammals with short, paddle-like front flippers and a straight or concave tail that is used as a propeller.

Commonly known as 'sea cows' as they graze on sea grasses.

Live in the sea (saltwater).

Adult dugongs weigh from 230 to 400 kg and can range from 2.4 to 4 m in length.

**IUCN**  
Red List:  
Vulnerable (VU)





# SEA TURTLES

Sea turtles are marine reptiles with a body encased in a bony shell.



Photo by Chun Xing Wong

They swim thousands of ocean miles during their long life times.

They wait decades until they can reproduce, returning to the same beaches where they were born to lay their eggs.

They were slaughtered for their eggs, meat, skin and shells, sea turtles still suffer from poaching and over exploitation.



# DOLPHINS

Dolphins are some of the smartest animals on Earth.

They feed on fish, squid and shrimp.

Each dolphin has a special whistle that it creates soon after it is born. This whistle is used for identification, just like a human's name.

Dolphins also produce high frequency clicks that tells the dolphins the shape, size, speed, distance, and location of a nearby object.

In Borneo, Irrawaddy Dolphins are commonly encountered. They love eating fish.

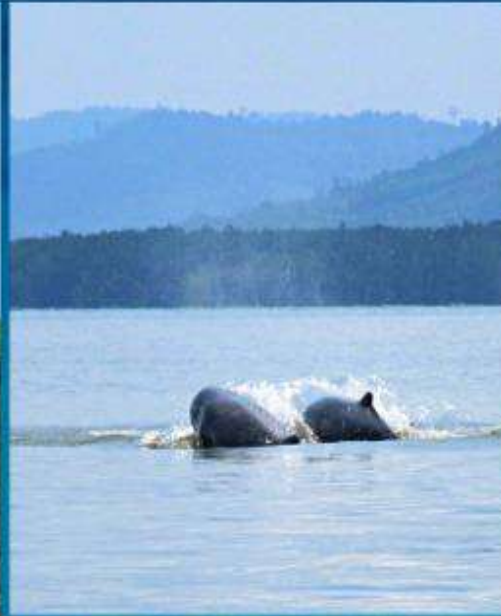
Dolphins face a lot of problems with getting trapped in the garbage humans leave on beaches.



Photo by Chun Xing Wong



# BORNEO DOLPHIN PROJECT



1StopBorneo  
Wildlife



@wildlifeclub

**#RESEARCH**

**#SUSTAINABILITY**

**#CONSERVATIONTOURISM**



# SHARKS

Sharks typically have a tough skin that is dull gray in colour and is roughened by tooth-like scales.

First lived or evolved 400 million years ago.

They are the top predators in marine ecosystems.

Diet: fish, crustaceans, molluscs, plankton, krill, marine mammals and other sharks.

Sharks must keep salt in their bodies to survive, and most can live only in salt water.

Many species are threatened with extinction.



## LET'S TEST YOUR UNDERSTANDING!

List the physical characteristic of the Dugong.

- 1)
- 2)
- 3)
- 4)

How heavy and how long is a Dugong?

- A) 100-400 KG and 2.4-2.9 M
- B) 240-350 KG and 2.4-3 M
- C) 150-300 KG and 3-3.5 M
- D) 300 -420 KG and 3-3.5 M
- E) 240-400 KG and 2.4-4 M

List the threats faced by Sea Turtles.

- 1)
- 2)
- 3)

Which of the following is the top predator in the marine ecosystem?

- A) Sea turtle
- B) Dolphin
- C) Shark
- D) Dugong

Do you think it is okay to consume turtle eggs? Why? Give us your personal opinion on how to stop people eating turtle eggs?





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# PLANTS

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# FUN FACT ABOUT PLANTS!

Do you know that Malaysia ranks amongst the world's most biodiverse countries (with more than 15,000 of flowers, plants and trees)?

**1**

## SOME PLANTS ARE CARNIVORES

These kind of plants obtain nutrients by eating various small insects and spiders. For example, the Venus Flytrap.

**2**

## PLANTS UNDERGO METAMORPHOSIS

The plant matter at the bottom of areas with water (such as swamps) can eventually turn into coal due to the process of changing form called metamorphosis.

**3**

## TREE RESIN

Tree resin that is fossilized is known as amber.

**4**

## LIST OF IDENTIFIED PLANTS

There are over 200,000 identified plant species in the world, and the list keeps growing.

**5**

## BAMBOO

Bamboo can be a fast growing plant, where some types can grow up to almost a meter in just one day.

**Kingdom: Plantae**



# ORCHIDS



*Rothschild's Slipper Orchid*  
Photo by Chun Xing Wong



*Elephant Ear Orchid*  
Photo by Shavez Cheema

Borneo has thousands of species of orchids, with over 1500 in Kinabalu Park alone!

Many are Epiphytes, which means they are growing on trees with no connection to the ground.

They can be found in lowland primary forest, hill forest & lower montane.

A good place to see orchids is:  
Native Orchid Centre in Sabah Agricultural Park, Tenom.

Places to see orchids:  
Poring Hot Spring, Kinabalu Park  
Botanical Gardens.



# PITCHER PLANTS



*Pitcher Plant (Nepenthes ampullaria)*  
Photo by Chun Xing Wong



*Pitcher Plant (Nepenthes veitchii)*  
Photo by Chun Xing Wong

Pitcher Plants are carnivorous (able to trap and digest small animals, especially insects).

They are partially filled with a liquid that digests the food.

They are of various sizes.

Pitchers plants are found in places where the soil is too low in minerals and/or too acidic for most plants to be able to grow.



# RAFFLESIAS



*Blooming Rafflesia flower*  
*Photo by Chun Xing Wong*

All Rafflesia have huge flowers but have no stems or leaves.

They grow on one type of climber known as the Tetrastigma vine.

The roots of a Rafflesia enter the stem of the vine to get its food and other nutrients. In other words, the Rafflesia needs the vine to live.

Because of this, Rafflesias are considered parasites, much like the ticks and fleas on cats and dogs.

Rafflesia have no leaves, no roots, no stem and are the biggest flower in the world.

106.7 centimetres (3 ft 6 in) diameter and 11 kilograms (24 lb) weight, with petal-like lobes an inch thick.



# RAFFLESIA

The largest Rafflesias can weigh up to 11kg.

It is one of the rarest plants in the world and on the verge of extinction.

It has a very strong and horrible smell of decaying flesh. Also known as “Corpse Flower”.

It is found in the rainforests of Borneo. For example, at the Rafflesia Information Centre, Tambunan.

*Rafflesia magnificia* -  
Status (IUCN Redlist):  
Critically Endangered (ER)



Photo by Shavez Cheema



# FIGS

Figs are known as 'kayu ara'.

Have stems with white sap.

Usually found near rivers or streams.

Grow in sandy or clay soil.

Can be found almost anywhere in Borneo.



*Rhinoceros hornbill eating figs*  
Photo by Shavez Cheema



# SHOREA

Shorea is a giant tree.

They have irregular flowering seasons.

Mass-flowering.

Can be found in tropical forests in Borneo.

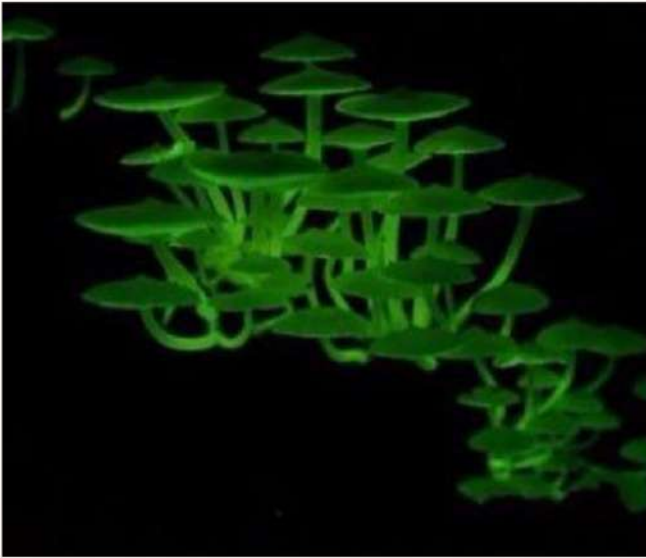
Members of the family are predominantly distributed in tropical lowland and hill forests in Borneo.



Photo by Shavez Cheema



# GLOWING FUNGI



Bioluminescent mushrooms  
*Photo by Shavez Cheema*

Some fungi have the ability to glow in the dark.

They attract light-loving insects, which spread their spores around.

Fungi are not true plants; they are saprophytic, that is obtaining nutrients from substrates such as wood on which they grow. This also means they are not parasitic since parasites feed on living organisms.

Glowing mushrooms are rare.

Places:  
Danum Valley



# PLANTS

## LET'S TEST YOUR UNDERSTANDING!

List the type of forests where the Orchid is usually found.

- 1)
- 2)
- 3)

Mushroom is a fungi, not a plant.

- A) True
- B) False

I have no roots, no leaves, and am known as the biggest flower in the world. Who am I?

- A) Glowing mushroom
- B) Pitcher plant
- C) Rafflesia
- D) Fig
- E) Shorea

I am carnivorous, so I am able to trap and digest small animals, especially insects. Who am I?

- A) Glowing mushroom
- B) Pitcher plant
- C) Orchid
- D) Fig
- E) Shorea

How a plant metamorphoses?  
Explain.





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# PLACES TO VISIT

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# KINABALU PARK

Kinabalu Park was established in 1964. Kinabalu Park is one of the most visited parks in Malaysia.

The park is located in Sabah in East Malaysia and covers an area of 75,370ha.

Well-known internationally for its diversity of flora, One of the best known parks in South East Asia for climbing activities in mountainous landscapes.

Mount Kinabalu (4,095m), the highest mountain between the Himalayas and New Guinea.

Its slope is home to a rich assemblage of plants and animal species.

It contains representatives from at least half of all Borneo's plant species and is exceptionally rich in species from the Himalayas, China, Australia, Malaysia, and pantropical floras.

Half of all Borneo's birds, mammals and amphibian species and two-thirds of all Bornean reptiles have been recorded in the Park.

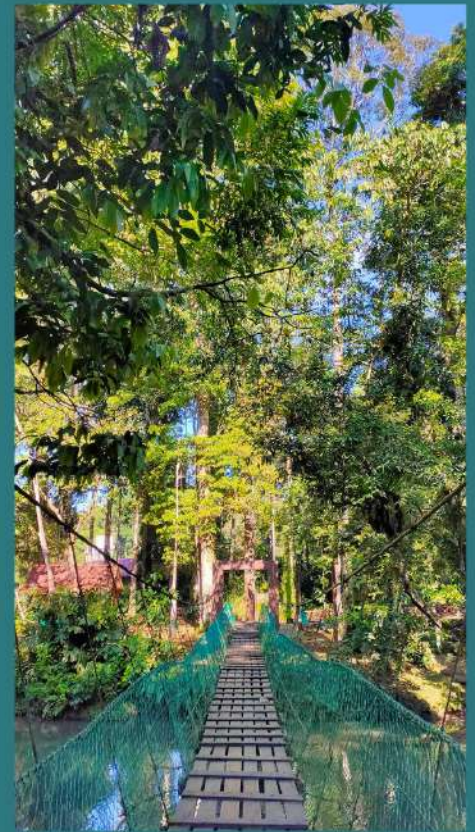
# TAWAU HILLS PARK

Tawau Hills Park is located 24 km north-west of Tawau in Sabah.

It was gazetted to protect water catchment resources for Tawau town and the Semporna Peninsula.



The terrain is hilly with two prime elevations - Gunung Magdalena (1310 metres) and Gunung Lucia (1201 metres). Bombalai Hill (530 metres) is also a major landmark.



The park is home to numerous plant and animal species.

It is also a popular spot for families and friends to enjoy a picnic or camping.



# KINABATANGAN

Kinabatangan is located in Sandakan, Sabah and contains Kinabatangan River, the second longest in Malaysia

Many major local tour companies run lodges in the Sukau area with packages that include accommodation, transportation, meals and guided tours.

It is home to Borneo's indigenous orangutan and proboscis monkey.

Surrounding forest is also one of only two known places in the world where 10 species of primates are found.

All the eight species of hornbill found in Borneo make the area their home.

# GUNUNG ALAB

Gunung Alab is located in the center of the Crocker Range in Sabah.

It is the substation of Crocker Range Park.

This place is suitable for hiking, and has a trail connected to Mahua Waterfall.

This place has an abundance of birds, orchids and pitcher plants.



# KAWANG FOREST

Kawang Forest is a recreational forest area located in Kampung Tanaki (Jln Lama Papar, Kota Kinabalu).

It has an excellent jungle trekking experience for adventurous nature lovers.

Visit the waterfall and go sightseeing at the Gua Kelawar (Bat Cave).

It is a good spot for camping and other recreational activities.

# OTHER PLACES

## Brunei

Wasai Wang  
Kadir

Tasek  
Merimbun

Luagan Lalak



Photo by Shavez Cheema

## Sarawak

Lambir  
Hills

Gunung  
Gading

Similajau

Bako Park



# JUNGLE TRIPS FOR KIDS!

We can organize child  
friendly jungle  
expeditions on Borneo!  
Contact us!





## PLACES TO VISIT

# LET'S TEST YOUR UNDERSTANDING!

If you want to see indigenous orangutan and proboscis monkey in the wild you can come here. Where is it?

- A) Kinabalu Park
- B) Gunung Alab
- C) Kinabatangan
- D) Gunung Alab

List the nature-based places we can go to in Sarawak.

- 1)
- 2)
- 3)
- 4)

I was gazetted to protect water catchment resources for Tawau Town and Semporna Peninsula. Where am I?

- A) Kinabalu Park
- B) Tawau Hills Park
- C) Kinabatangan
- D) Gunung Alab

This place has an abundance of birds, orchids and pitcher plants and it is located at the center of Crocker Range. Where is it?

- A) Kinabalu Park
- B) Tawau Hills Park
- C) Kinabatangan
- D) Gunung Alab

If you were given a chance to go to one of these nature places, where would you go? Why?







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# PROBLEMS

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In this section, we are highlighting some conservation challenges so that you can understand they are occurring at this very moment. There is something you can do about it! But first, let's understand what, how and why these problems occur in the first place.



# CONSERVATION CHALLENGES

## POACHING



This is a poacher sitting on a banteng bull that he has just shot in the Tabin Wildlife Reserve. (Picture by Danau Girang Field Centre)

This is a bull elephant that was murdered by ivory poachers in central Sabah. (Picture by Sabah Wildlife Department)



Source:

<https://www.freemalaysiatoday.com/category/nation/2019/06/30/poaching-of-sabah-wildlife-on-the-rise-says-conservation-body/>

## ONLINE SALE

Salam gais. [redacted] ada beberapa ekor pets yang manja teruk dan comel dan rare 🥰 okay kita ada :

- !! Baby slow loris yang comel giler 580
- ⚠️ Baby musang pandan cute 350
- 👉 Beruk panjat... See More



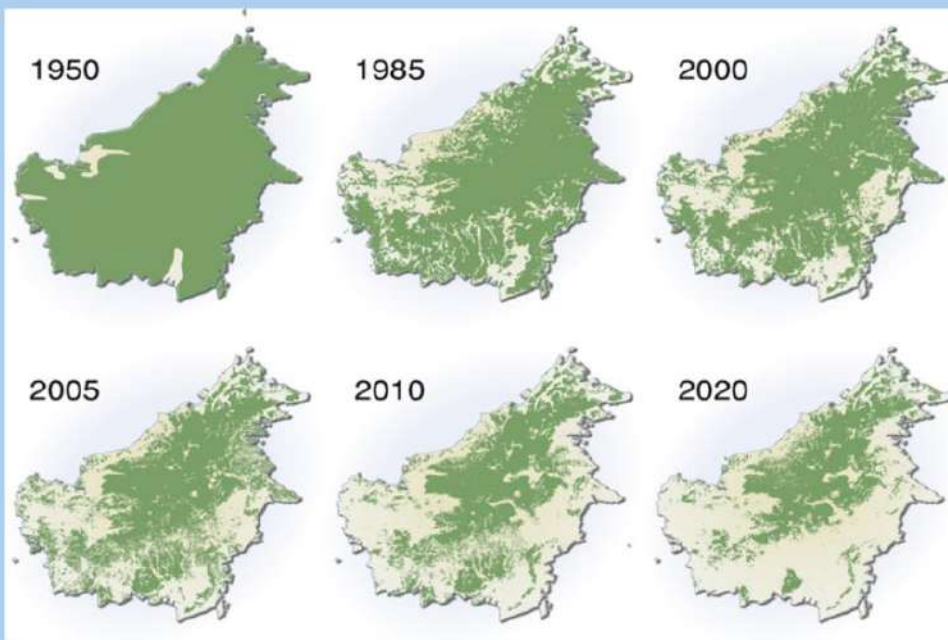
Source: <https://news.mongabay.com/2019/05/social-media-enables-the-wildlife-pet-trade-in-malaysia/>



Source: <https://www.bbc.org/my/bear-talk-blog/time-to-bring-down-notorious-wildlife-trader-in-malaysia>

These are some examples of wildlife trade that have been spread through social media. If you see something like this, do report the page/social media immediately as it can help decrease the business of wildlife trade.

# DEFORESTATION



(Source: Borneo Orangutan Survival Schweiz: <http://www.bos-schweiz.ch/img/01/deforestation.jpg>, accessed 14.04.2020)

The figure shows the changing abundance of the forests in Borneo from 1950 to 2020. This is mainly due to human activities such as clearance of land for oil palm plantation, agricultural expansion, cattle breeding, timber extraction, mining, oil extraction, dam construction and infrastructure development.





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# **SOLUTIONS**

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# SOLUTIONS

## RESEARCH



## EDUCATION

It's important to understand that you are capable of changing the world.

What you do will determine the future of our Bornean wildlife and the environment. Through education, public awareness towards wildlife can be raised and eventually help to improve the conservation of wildlife in the future.

## ENFORCEMENT

The implementation of wildlife laws is vital as they can help to protect wildlife from harmful human activity. Although animal protection legislation has improved in recent years, the criminal justice system still does not prioritise it in many cases. Enforcement of these wildlife laws will help to overcome the unsustainable practice.

## TEACHING

Learning about wildlife does not happen only at school. It can be done everywhere. It can also be undertaken in other places, for example

<https://www.worldwildlife.org/teaching-resources> from WWF.

Teaching and exposure to wildlife can assist people to appreciate it.

## TOURISM

You must be wondering, "How does tourism become one of the solutions to wildlife problems in Borneo?" Well, if conducted well, tourism can help stop unsustainable activities, such as poaching, by providing locals with a major long-term source of jobs and income. Nowadays, nature tourism has also been considered one of the major contributors to poverty reduction. Added to this is that when people realize the economic benefits that wildlife as well as nature tourism can bring, they will fight for conservation instead.



# 1STOPBORNEO WILDLIFE



## *Description*


**1StopBorneo Wildlife was founded in 2012. We do wildlife research, have a rescue service (125 animal rescues to date), have a widespread education program (have conducted over 130 workshops to date) and develop Conservation Tourism projects, these are economic model to save wildlife in Marudi Sarawak, Brunei Darussalam and Tawau, Sabah (March 2020).**

**Chapter edited and compiled by Yulinda Wahyuni, Shavez Cheema, Irene Azam, Farah Za, Chun Xing Wong, Bazilah Za, Richard Thomas, Violet Velu, Natalie Ben, Bud Chapman, Abdul Ranit, Adelaide, Ledumin Duraman, Julie Gordon and Martin.**

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