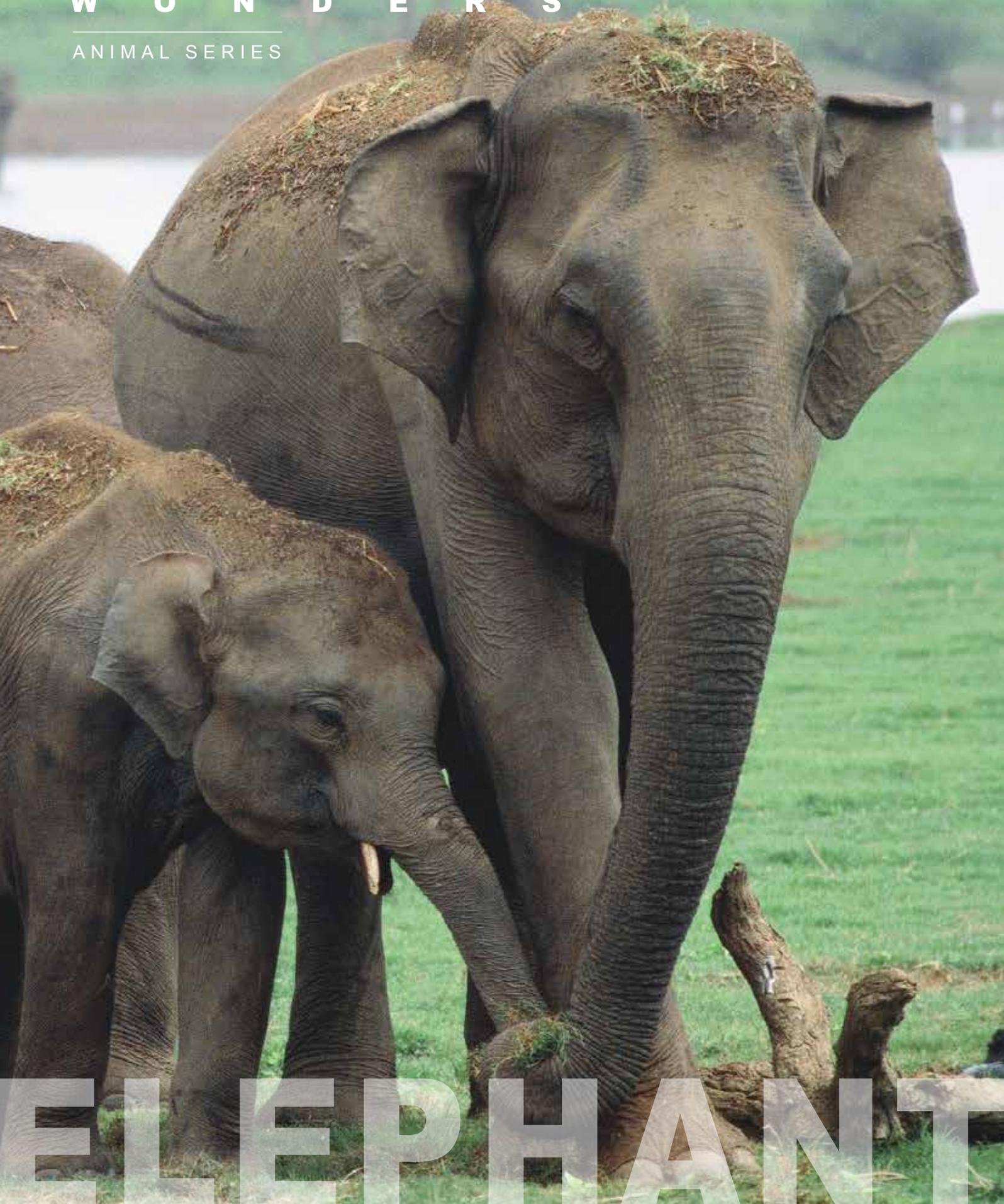


# Wildlife

W O N D E R S

ANIMAL SERIES



ELEPHANT



## THE LAND GIANTS

Elephants are not only the largest land animals but also among the most intelligent creatures on Earth. Their unique body structure, complex social behaviour and intriguing communication network epitomize Mother Nature's wonderful creation.

Few animals can rival the close association elephants have with humans. Since their domestication some 4,000 years, Asian elephants have influenced the Asian way of life more significantly than any other animals. Revered as gods in Hinduism, regarded as sacred in Buddhism, trained as tanks for battlefields and tamed as servants for logging, elephants played, and will continue to play an important role in the lives of thousands of Asians.

It is unfortunate elephants' tusks, a powerful tool and status symbol in elephant societies, are so treasured by man that thousands of elephants have been slaughtered in cold blood for the ivory trade. There were five million African elephants 100 years ago. Today, only about 350,000 are left. Though protected by the law now, African elephants, and to a lesser extent Asian elephants, continue to die in the hands of poachers.

However, the ivory trade is no longer the primary threat to the survival of elephants. As human populations balloon in Asia and Africa, the land giants are finding it increasingly difficult to live alongside man.

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written by: lok may kuen  
design: chris sam ngan yin

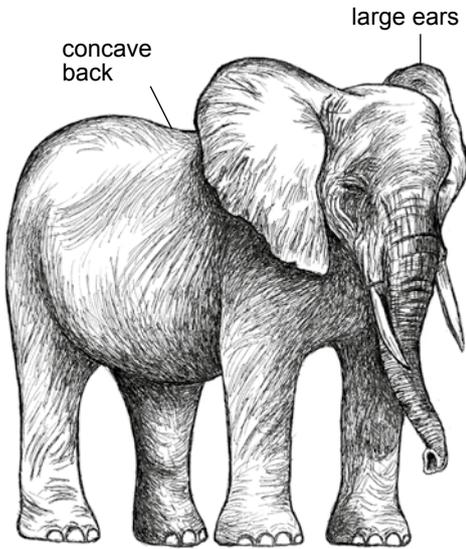
# WHO'S WHO

## AFRICAN AND ASIAN ELEPHANT

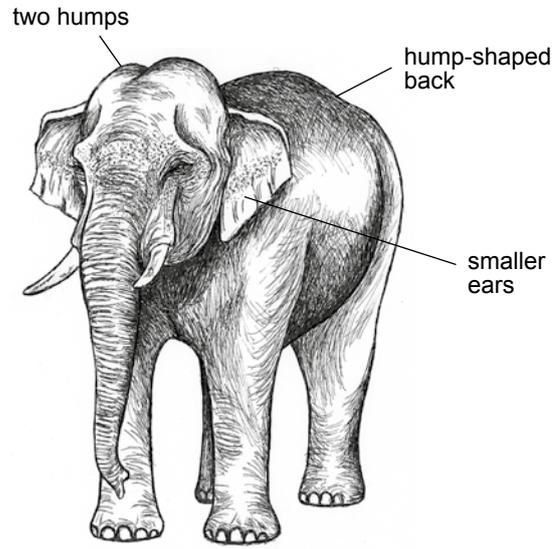
African elephants are larger than their Asian cousins. There are also other obvious differences that tell them apart.

There are different subspecies or races of African and Asian elephants. Let's find out who's who.

illustrations: joe ong



AFRICAN ELEPHANT

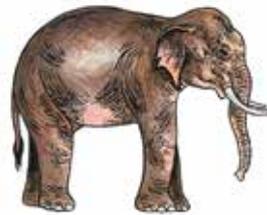


ASIAN ELEPHANT



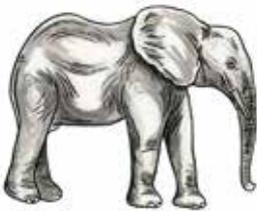
**AFRICAN SAVANNA ELEPHANT**  
*Loxodonta africana africana*

The largest of all elephants.  
Record height = 3.96m  
Record weight = 12,240kg



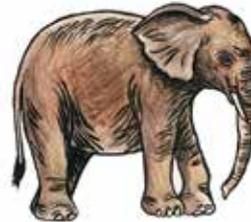
**SRI LANKAN ELEPHANT**  
*Elephas maximus maximus*

Largest and darkest of the Asian elephants. Pink spots on face, ears, trunks and belly.



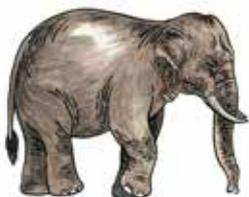
**AFRICAN FOREST ELEPHANT**  
*Loxodonta africana cyclotis*

Lives in the rainforests of Central and Western Africa. It is smaller, lighter in colour, and has straighter tusks compared to the savanna elephant.



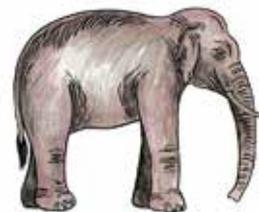
**PYGMY BORNEO ELEPHANT**  
*Elephas maximus borneensis*

The smallest of all elephants. Found only in Borneo. Has a smaller face and longer tail compared to other Asian elephants.



**MAINLAND ELEPHANT**  
*Elephas maximus indicus*

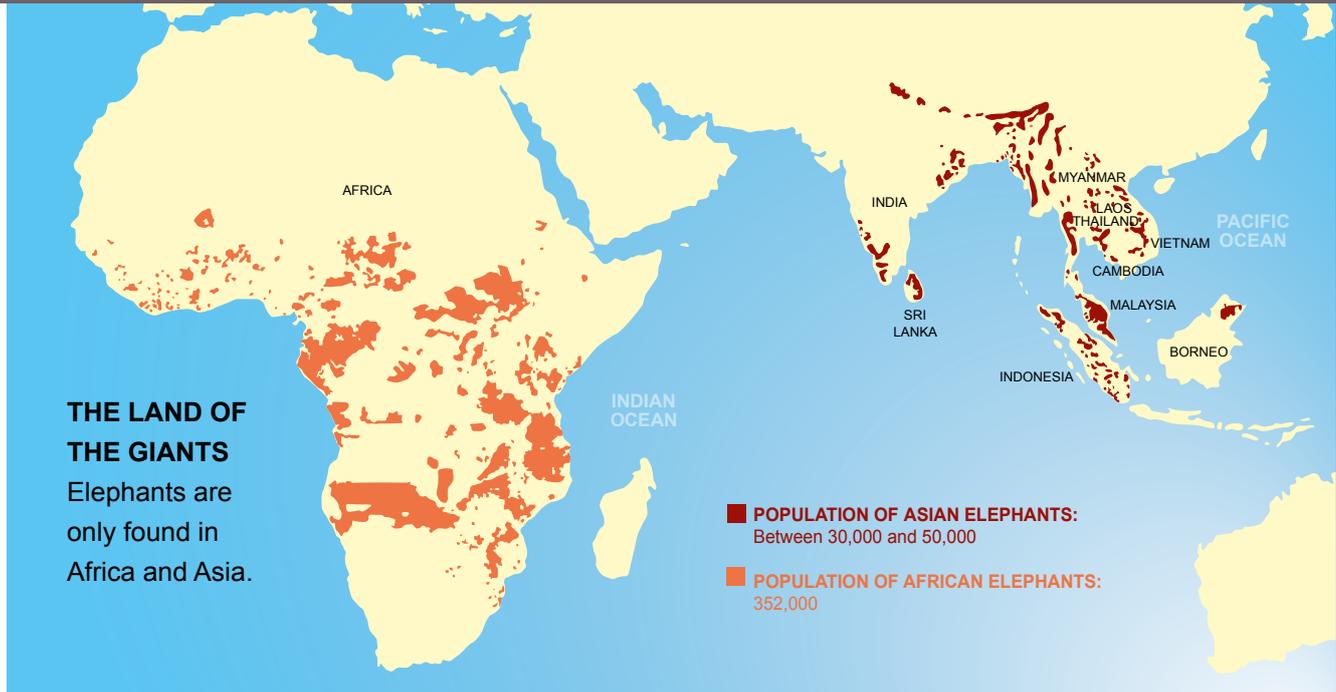
May have pink spots on ears and trunks but are much less distinct compared to the Sri Lankan elephant.



**SUMATRAN ELEPHANT**  
*Elephas maximus sumatran*

Lightest in colour compared to the other Asian elephants.



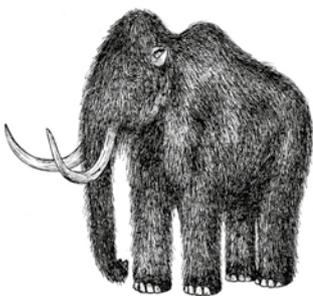


### RELATIVES – DEAD AND LIVING

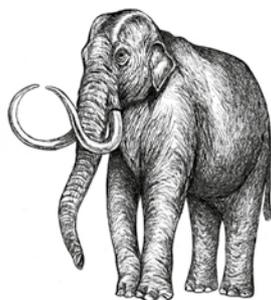
The woolly and imperial mammoths were among the early ancestors of the modern day elephants.

Woolly mammoths died out some 10,000 years ago because of hunting and climate change. Their remains were discovered in Siberia.

Imperial mammoths died out at about the same time as the woolly mammoths. The remains of these extinct animals were discovered in North America and Canada.



Woolly Mammoth



Imperial Mammoth

The manatee is another close relative of elephants. It is known as sea cow because it grazes on aquatic plants for up to eight hours a day. Its molar teeth are constantly being replaced as they wear down from chewing. New teeth move forward to replace the old ones, much like those of an elephant.

With the size of a domestic cat, it is hard to imagine that the rock hyrax is a close relative of elephants. Like elephants, it lives on a plant diet and has long front teeth that grow non-stop. The bone structure of its feet is like that of the elephant.

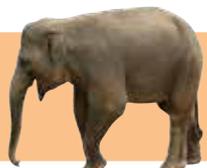


Manatee



Rock hyrax

**DID YOU KNOW?**  
The name of the country Laos means *'the land of a million elephants'*.



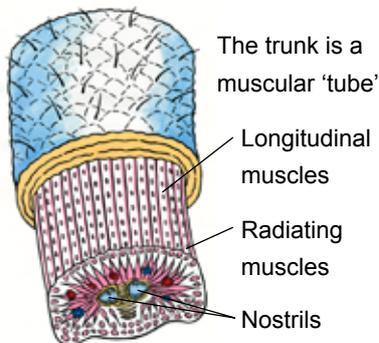

# A TRUNK FULL



photo: fong chee wai

The most distinctive feature of the elephant is its trunk. This unusual structure functions as a nose, hand, multi-purpose tool and an arm. Without the trunk, most elephants are unable to survive in the wild.

The trunk is the fusion of the nose and upper lip. It has no bones or cartilage. It is made of about 100,000 muscles.



## A POWER-PACKED TRUNK

The muscular trunk is an essential tool for feeding. Elephants use it as a 'hand' to grasp grass and leaves and bring food to their mouth.

The trunk is powerful enough to kill a lion with a single blow and sufficiently strong to lift up logs weighing over 400kg.



## NOSING AROUND

Elephants do not have good eyesight and their vision is especially poor at night. However, they have a very keen sense of smell. With their trunks raised, they wave them in the air and sniff out water and food sources, as far as 10km away.



## STAYING IN TOUCH

Trunk touching is a form of greeting among herd members, especially after hours or days of separation. It is also used to reassure frightened herd members. Female elephants often use their trunks to caress their calves.

## TRUNK AND FINGER

At the tip of the trunk is a finger-like projection, which functions like our fingers. This projection is very sensitive and dexterous enough to pick up objects such as a coin, a feather or a twig.



Asian elephants have only one finger-like projection at the tip of the trunk whilst African elephants have two.





#### TRUNK TO DRINK

Elephants use the trunk to suck five to ten litres of water at one go and squirt it into their mouth. In extreme drought conditions, elephants have been known to use the trunk to extract water from the throat to wet their ears.

#### SHOWERS AND SAND BATHS

The trunk comes in handy during shower time. Elephants spray water to refresh themselves and also to express irritation. They use their trunks to dust sand on the back to protect the skin from sunburn and to keep pesky insects away.



#### BABIES & TRUNK

Baby elephants have a droopy trunk tip as they cannot control the muscles yet. They have to observe the other herd members and learn to use the trunk to suck water and squirt it into the mouth. In fact, newborn elephants are so clumsy with their trunk that they may trip over it.



minden pictures / frans lanling

#### UNEXPECTED GUESTS AT PULAU TEKONG

Elephants are able to swim across rivers and lakes, using their trunks as snorkels. In May 1990, three elephants caused a stir when they swam across from Johor Bahru to Pulau Tekong, one of Singapore's offshore islands.



# TUSKS AND TUSHES

3.5m

## THE WORLD'S LARGEST TOOTH

The tusks are the incisors (front teeth) of the elephant. They are used to lift logs, strip tree bark, dig for water, as a weapon and a status symbol. An elephant usually uses one tusk more than the other, much as the way we use our right and left hands.

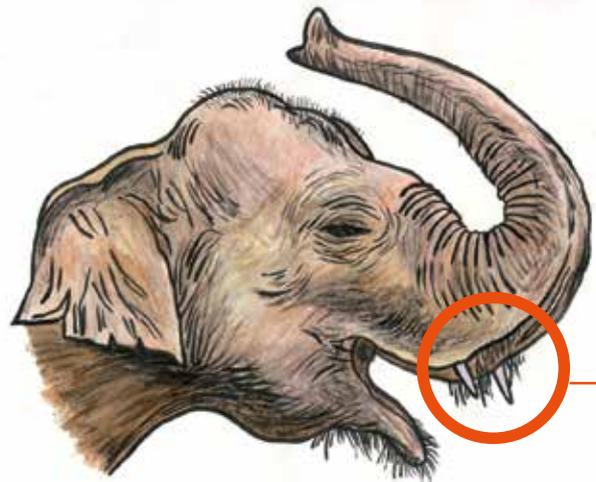
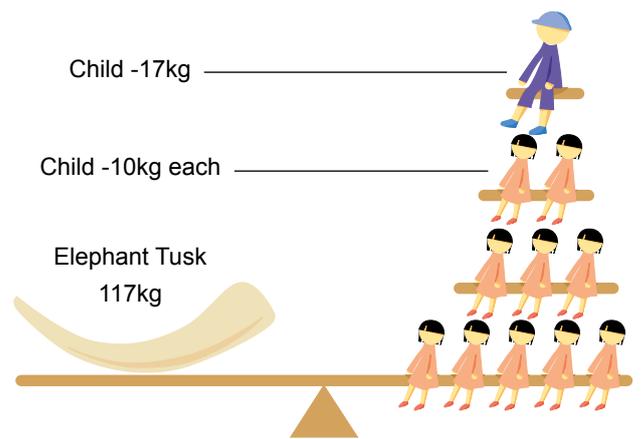
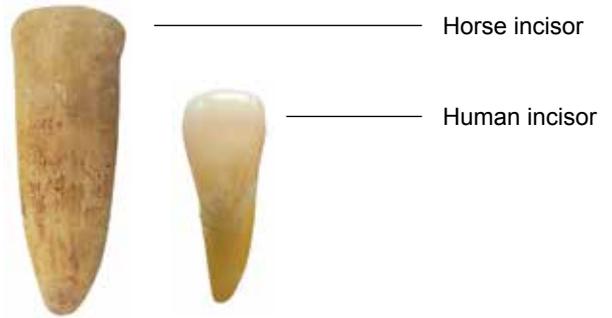
Elephant tusks are the world's largest teeth. African elephants, being bigger than their Asian cousins, hold the record for having the longest and heaviest teeth in the world.

Record length = 3.5m  
Record weight of single tusk collected = 117kg

One elephant on record had a pair of tusks that weighed 211kg in total. Imagine having to carry these heavy teeth around!

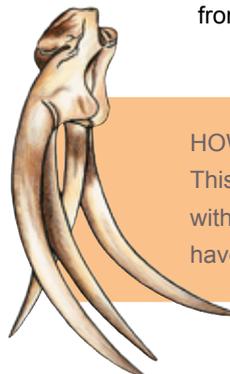
However, with rampant poaching, males elephants are often killed before they have time to grow impressive tusks.

**TUSKS AND TUSHES**  
Both male and female African elephants have tusks. For Asian elephants, only males have tusks.



illustrations: joe ong

Female Asian elephants do not have tusks. The incisor teeth, which protrude slightly from their mouth, are called 'tushes'



### HOW MANY?

This broken skull belongs to an elephant with four tusks. Elephants with seven tusks have been recorded.

1.2m

photos: lim ai kheng



# MEGA MEALS & GRINDING MACHINE

photo: william nai



This is the amount of food our elephant Komali eats in one day – about 180 kg. She also gets salt blocks as salt supplements.

## SALT CARVE

All animals need salt for their body to function. Like many herbivores, elephants need to supplement their diet with salt to make up for the lack of it in their plant diet. Wild elephant herds travel long distances to areas with mineral-rich earth or rocks (known as salt licks). Salty earth or rocks are dug up, ground with the massive molars and swallowed.



Salt block

## ELEPHANTS SPEND 3/4 OF THEIR LIFE EATING

Elephants need a large quantity of food to maintain their enormous frames and yet they have a very ineffective digestive system that can digest only 40% of what they eat. Therefore, the land giants have to spend most of their time eating – about 18 hours a day.

An adult elephant chomps up about 200kg of plant matter daily and large bull elephants can consume twice the amount!

Elephants need lots of water too, consuming 100 to 150 litres per day, and over 200 litres on very warm days.

## GRINDING MACHINES

Plant matter is tough and therefore difficult to break down. To deal with the huge amount of leaves and grass they eat daily, elephants need very strong

'grinding machines' to help chew the food and break it down physically before it is swallowed. These 'machines' are their huge molar teeth.

An elephant usually has a set of four molar teeth, one on each side of their jaws, at any one time. These teeth are replaced when they wear out. Elephants have only six sets (24) of molars within their life span of 60 to 78 years. They die of starvation after they lose their last set of molars.

photo: fong chee wai



Say ahhhhhhh... Gambir, our playful elephant opens her mouth to show off her huge molar tooth.





Molar, young Asian elephant

The ridges are shallow and less pronounced in very young elephants.



Molar, Human

Omnivore, molars have small grinding surface to break down food.



Molar, Asian elephant

One molar of a mature elephant weighs over 1.5kg. The ridges on the surfaces are used for grinding plant matter.



Carnassial, Tiger

Molars in carnivores are modified as carnassials. They have no grinding surfaces. Instead, the molars function as 'scissors' to cut meat.



Molar, African elephant

The ridges of the molar tooth of African elephants are patterned differently from those of Asian elephants. The ridges are referred to as 'lozenges', which gave the African elephant its scientific name *Loxodonta* (loxo = lozenges and donta = teeth).



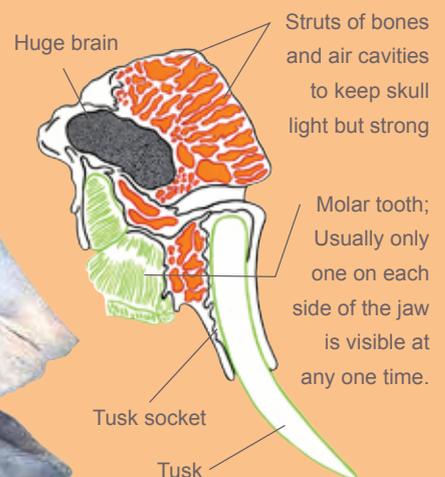
Molar, Horse

Herbivore, molars with grinding surface to break down plant matter.

photos: lim ai kheng, illustration: joe ong

**BIG SKULL, BIG BRAIN...**

Elephants have biggest brain of all land animals. It is about five times larger than ours. No wonder an elephant never forgets! The land giants require a very huge skull to house their teeth and big brains. To lift the enormous weight, the skull needs to be extremely strong and yet light, made possible with the presence of struts of bones and air cavities above the brain cases.



# PRECIOUS POO



Elephants excrete 60% of the amount they consume in the form of undigested food. Thus, elephant dung is fibrous and great as manure and a source of food for many plants and animals.

## DISPERSAL AGENTS

Elephants are important dispersal agents for many plants. As they forage over large areas, they pass out undigested seeds. Most of these seeds will germinate eventually.

## DUNG FOOD

Elephant dung provides food for many species of beetles, flies, worms and other dung-eating creatures, of which the best known being the dung beetles.



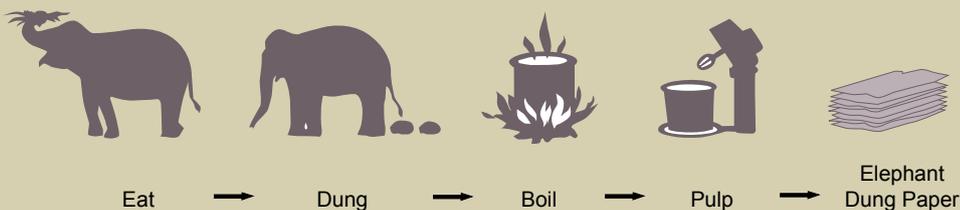
Seeds passed out from elephants stand a good chance of germinating because they have a ready supply of nourishment from a heap of elephant manure. In fact, the seeds of the acacia plant do not germinate unless they go through the digestive system of an elephant.



Dung beetles lay their eggs in animal dung, including that of the elephant. They use their front legs to shape the dung into balls. When the eggs hatch, the dung balls become a ready food source for the larvae.

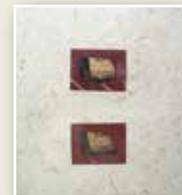
## ELEPHANT DUNG PAPER

Owing to its fibrous nature, elephant poo is perfect for making recycled paper. Here's how we can turn poo into paper:



The texture and colour of the paper differ with the elephant's diet and age. Elephants that eat coconut leaves produce dung that churns out papers of a light shade, Kitul bark tends to give a darker tone.

Young elephants with good teeth chew their food well to give smooth paper while older ones with bad teeth and a poor digestive tract produce rougher paper.



Elephant dung papers



## ELEPHANT SOCIETIES

Elephant herds are led by an experienced female or matriarch. She has to find water and food for the herd. She settles disputes among herd members. Herds often split up to feed for a few hours, or even a few days. However, each mother and calf group always stays together. When herd members meet up again, they greet one another with sniffs and rumbles.

Adult females within the herd help to look after the young. Males leave the herd once they reach sexual maturity to lead a solitary life or join bull herds.





# EARS & FEET

## GIANTS ON TIPTOE

Despite their size, elephants are very light-footed because they walk on tiptoe! A layer of fatty tissue serves as heel cushion to absorb the impact of the elephant's weight as it walks.

When an elephant steps on the ground, the heel cushion spreads out to distribute its weight and prevents it from sinking into mud. It also acts as a spring to push the foot off the ground.

Heel cushion made of fatty tissue.

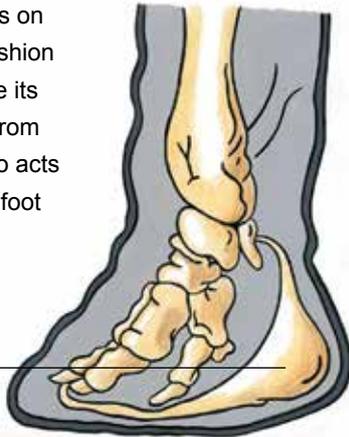


illustration: joe ong

## CRACKED SOLES

Elephants can climb steep hills and cliffs easily. They have cracks and ridges on their soles to provide a good grip.

The ridges on an elephant's sole function are like the cleats of a boot – they are great for steep climbs.



Our keeper examining the foot of Neha, the youngest of our elephants. She enjoys regular pedicure sessions which include trimming of toe nails and removal of trapped dirt. Proper foot care is essential to prevent elephant foot rot.

## BIG EARS

The African elephants have the biggest ears in the world, measuring up to 2m from top to bottom. They have big ears not just to hear well but also to lose heat. When an elephant is angry, it scares its enemy by raising its ears so that it looks even bigger.



African elephant



Asian elephant

African Savanna elephants have much larger ears than the Asian elephants. The huge ears are an adaptation to life in the scorching African plains.

## EAR FLAPPING

The hotter it is, the faster an elephant will flap its ear. With each flap, the air around the body gets cooler. On windy days, elephants simply hold their ears out sideways to catch the breeze.

The ears are packed with blood vessels. As blood circulates, excessive heat from the elephant's body is allowed to escape through the skin of the ears.



photo: fong chee wai



# SKIN CARE

## MUD SPAS AND SAND SHOWERS

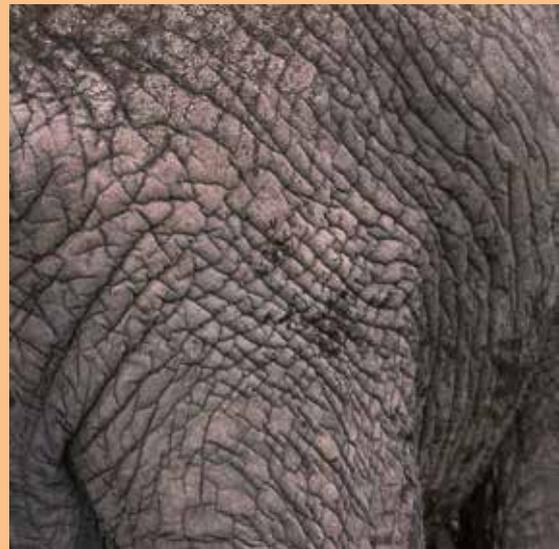
The land giants discovered the benefits of mud spas long before we did. They love to wallow in mud, which moisturises their skin and protects it from sunburn and insect bites. Sand showers are also effective in preventing sunburn and attacks from pesky insects.



The colour of a wild elephant is dependent on the colour of the mud wallows found within its home range. It is not uncommon to see red, brown, black, light grey or even yellow elephants emerging from mud wallows.

## COOL WRINKLES

'Wrinkles' is a much-dreaded word for most people but not for elephants. Wrinkles help to keep the giants cool. They increase a surface area, exposing a larger area of the elephant's body to water during a bath. The cracks and crevices trap moisture and mud, thereby cooling the body for a longer period.



# A GIANT IS BORN

## A LONG WAIT

Mature female elephants within the same herd often have babies at about the same time and look after their young together. Elephants have the longest gestation of all mammals - 20 to 22 months, the longest ever recorded was 25 months. Baby elephants suckle for three to five years. Owing to the long gestation and extended period of parental care, an adult female may produce only one calf once every five to seven years.

## JUMBO BUNDLE OF JOY

At birth, a baby elephant can weigh some 150kg. Birth can occur any time of the year if food is abundant. In areas where food is scarce during the dry season, most births take place during rainy seasons to ensure that the mothers have plenty to eat and are sufficiently nourished to produce milk for the calves.



Baby Neha was born in Night Safari on 12 May 2016. At birth, she weighed a whopping 149kg! 'Neha' is Hindi means 'love'.

## SMIFFING OUT A NEW ARRIVAL

A new arrival in the herd always causes a wave of excitement. All the females in the herd will gather around and sniff the newborn. They will rumble and touch the baby all over with their trunks.



## LOVING MOTHERS

Female elephants have been observed to cast their shadow over their sleeping calves to keep them cool. As the sun moves across the sky, they reposition to ensure that their shadow remains cast over their babies.



Baby, enclosed in an amniotic sac, emerges.



Baby's out! A keeper helps to remove the sac and free the baby. In the wild, an experienced female acts as a 'midwife' and helps the mother remove the sac if it is not broken at birth. In cases where such help is not available, the mother has to perform this duty herself.



Baby is able to stand up soon after birth.



Instinctively, baby starts to suckle.

Photos courtesy of Maesa Elephant Camp, Chang Mai.



# TRUNK CALL

Elephants trumpet and make many other calls, probably less known to us. They rumble, roar and pine.

## WHAT'S IN A CALL?

Elephants use different calls to reflect different moods.

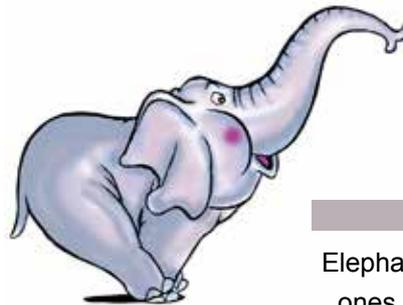
## TOO LOW TO BE HEARD?

Elephants produce infrasounds, which are too low for us to hear. They use the sounds to look for mates and to tell one another about locations of food and water sources. Elephants use these sounds to 'talk' to one another over distances as far as 9km away.



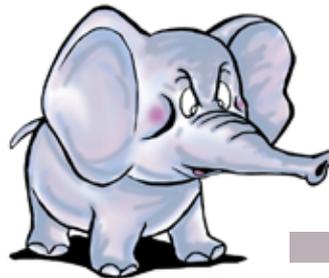
## TRUMPET

Elephants trumpet when they are playing with one another. Our elephants trumpet when they go for walks.



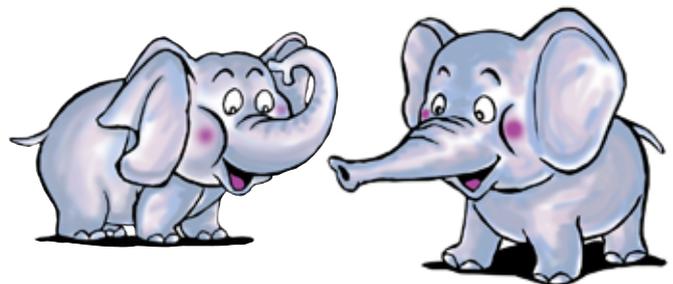
## PINE

Elephants, especially young ones, pine to get attention.



## ROAR

When elephants roar, it means that they are agitated. Stay Away!



## RUMBLE

Elephants rumble to greet herd members.

Visit Elephants of Asia at Singapore Zoo to listen to the trunk calls.



# MAN & ELEPHANTS

Few animals, if any, can rival elephants' close association with man, especially in the Asian context. The association is a strange one – elephants are revered and worshipped and yet they are also enslaved and slaughtered.

## WAR ELEPHANTS

Elephants played a prominent role in many battles. War elephants entered battlefields during the fourth century, before the time of Alexander the Great. Hannibal, a young general from North Africa, came close to bringing the Roman Empire down with 40,000 men and 38 elephants. During World War II, elephants were used to haul planes. The Thais are said to have gained their freedom on the back of elephants during the war against Myanmar. Even today, elephants are sometimes used in jungle warfare for moving men or heavy loads through terrain that is impossible for machines to operate.

## ELEPHANTS AS GODS

Elephants are worshipped by Hindus. Every Hindu temple features the popular elephant-head god, Ganesh or Ganesa. Elephants are revered by Buddhists and are kept in some monasteries.



Hindus pray to Lord Ganesha, the popular elephant-head god, for good fortune and to remove obstacles. All over India, hundreds of Ganesha's statues are dropped into the sea and rivers every year at the end of a ten-day festival that celebrates his birth.



It is believed that Queen Maya gave birth to a son, who would become Buddha, after she dreamt of a white elephant entering her body.



The annual Perahera Festival in Kandy, Sri Lanka, features a parade with 100 elephants. The religious relic containing the sacred tooth of Buddha is carried by the biggest elephant with the most impressive tusks.



Hunting trips on elephant backs were one of the favourite pastimes of aristocrats in India.



A ring or bracelet made of elephant hair is believed to bless and give the wearer the 'power' of the elephant.



## DID YOU KNOW?

Before 1782, all elephants in Thailand belonged to the King. No one else is fit to own an elephant.



# WORKING ELEPHANTS

Large-scale logging of teak trees in India, Myanmar and Thailand using Asian elephants was carried out in the 1900s. Logging elephants were often subjected to cruel treatment, suffered injuries and many literally worked to death.

Elephant logging is now illegal in most countries but it is still being carried out in parts of Asia.

## MY BACK HURTS!

Despite being good at hauling and lifting, elephants do not make good pack animals because their back cannot take weights of more than 500kg.



Elephants are extremely good at lifting, pushing and hauling objects. One elephant could haul a log weighing over 4,000kg. They are able to walk on rough terrain that is inaccessible to modern machines.

## JOBLESS ELEPHANTS

In 1989, Thailand banned rainforest logging. Suddenly, some 4,000 working elephants and their mahouts found themselves jobless.

A number of mahouts turned to illegal logging. Others enter cities with their elephants and use them to beg from tourists. The elephants were subjected to long hours of hard work without proper care and medical attention.

Fortunately, some elephants were rescued and are cared for in well-run sanctuaries.

Right: City elephants inhale exhaust fume, do not have proper or sufficient water to drink. Often they break their legs on concrete pavements and uncovered manholes.

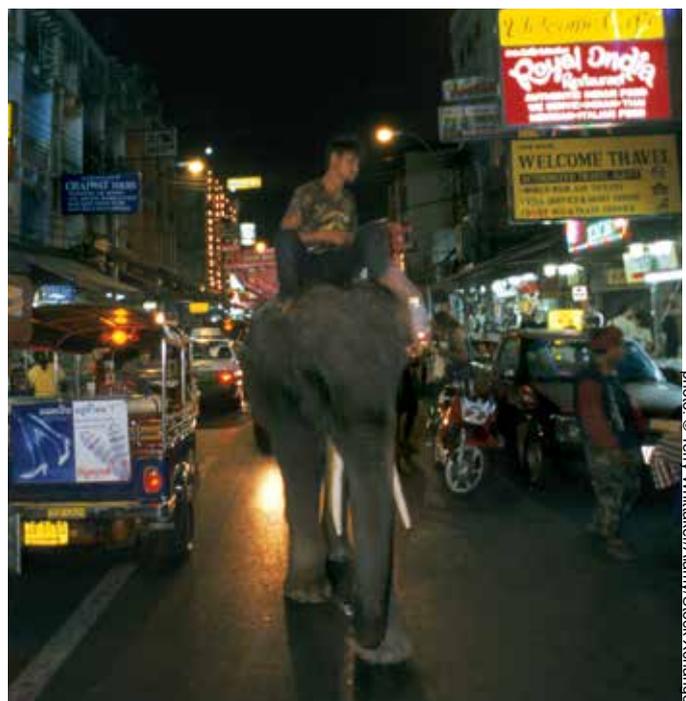
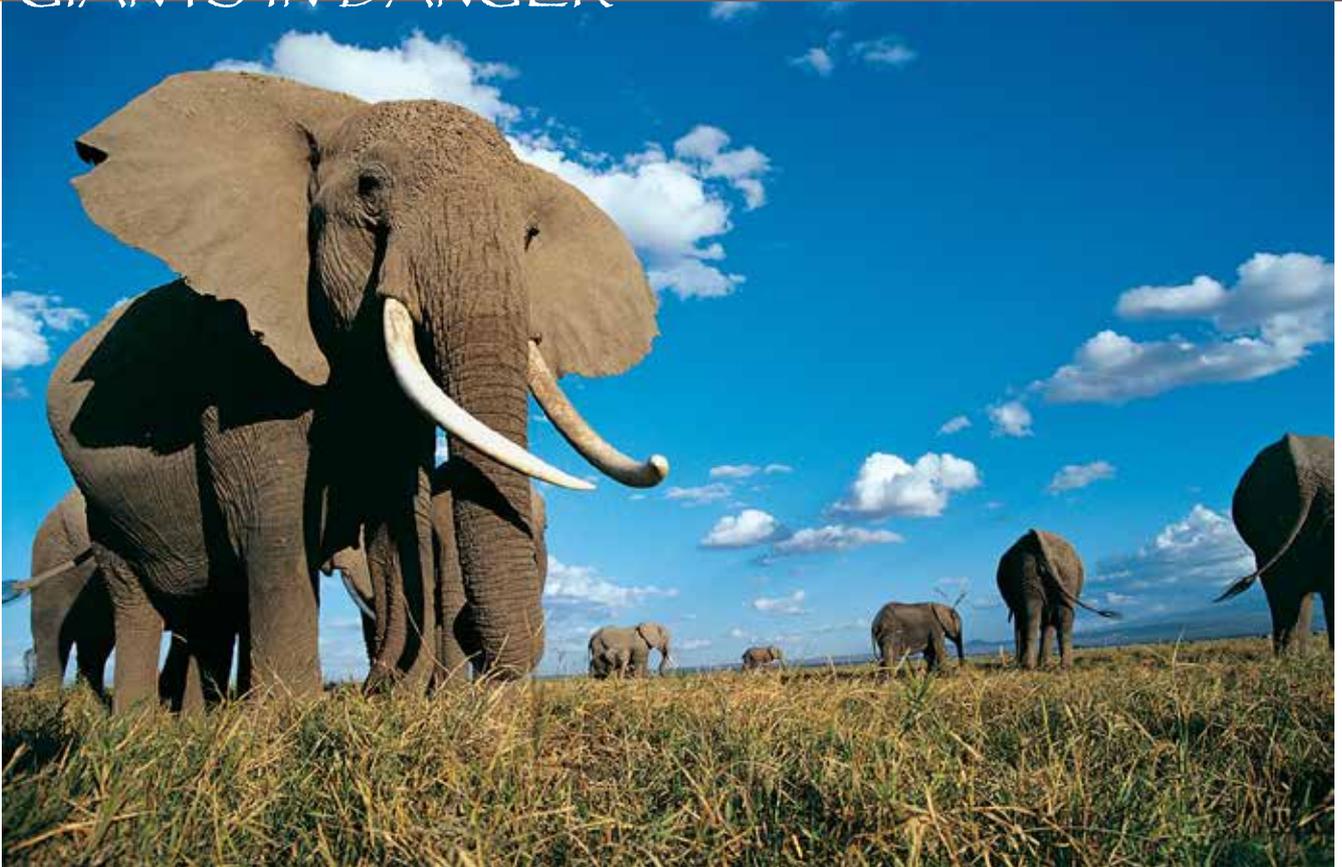


photo: © Terry Whitaker/Alamy/Stock Xchange



# GIANTS IN DANGER



## THE IRRESISTIBLE IVORY

Before the invention of synthetic materials, ivory was carved into everything, from billiard balls, electrical insulators to knife handles and furniture. Millions of elephants were killed for their tusks to meet the demand for ivory. African elephants were more badly affected than their Asian cousins - their tusks, being generally bigger and present in both the males and females, make them more attractive to poachers. Within 100 years, man managed to reduce the population of African elephants from five million to a mere 350,000.

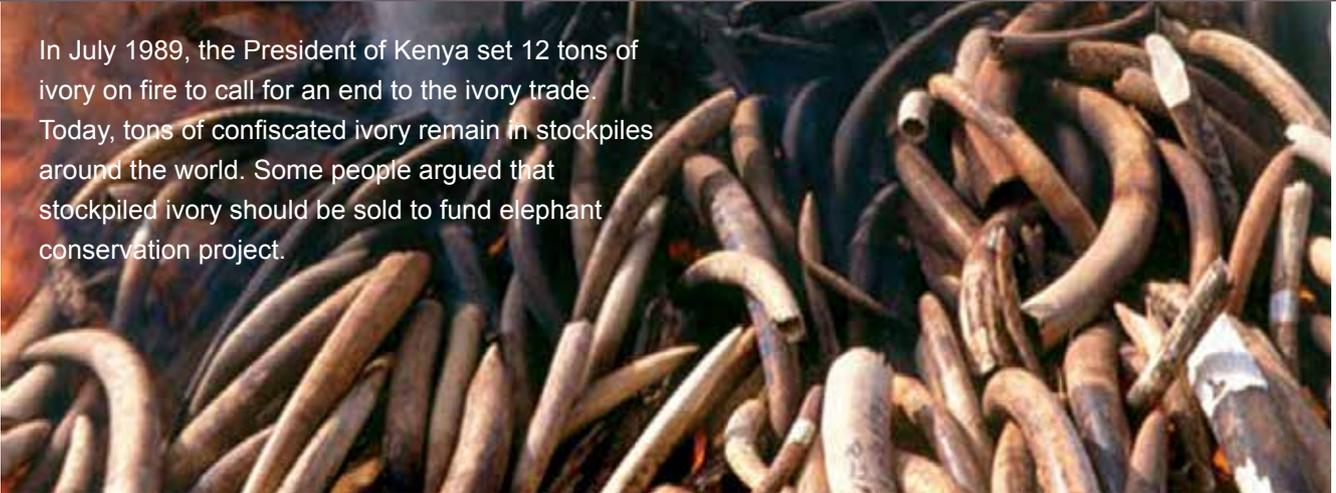


This ivory horse is a sad reminder of our deadly ability to destroy the natural world and wipe out life forms that are much stronger and larger than us.

Killing of elephants became a very serious problem in the 1980s. During that period, some 100,000 elephants in Africa and Asia died every year because of the ivory trade.



In July 1989, the President of Kenya set 12 tons of ivory on fire to call for an end to the ivory trade. Today, tons of confiscated ivory remain in stockpiles around the world. Some people argued that stockpiled ivory should be sold to fund elephant conservation project.



### THE IVORY BAN

In 1989, elephants were listed on Appendix 1 of CITES, which disallows a particular species or its body parts to be traded. Many countries agreed to ban the ivory trade. Today, elephants continue to face the threat of poaching.

### WHEN IT GETS TOO CROWDED

Elephants now face another serious problem - habitat loss. Approximately 20% of the world's population live within or near the range of Asian elephants. The homes of both African and Asian elephants are being logged and cleared for agricultural development and human settlement.

As humans invade the land of the giants, human-elephant conflict becomes inevitable. Elephants enter farms to feed on crops and to drink. In one night, they can destroy the entire plantation, leaving farmers with nothing to feed their families. Apart from feasting on the crops, elephants may kill villagers too. This results in retaliation by villagers.

Elephants and humans love this. Elephants are able to sniff out ripe corn from 10km away. Sometimes, they get killed by farmers and pay a dear price for feasting on forbidden food.



Visit <https://bit.ly/WRSSupport> to find out how Wildlife Reserves Singapore help to mitigate human-elephant conflict.

### HOT IDEAS

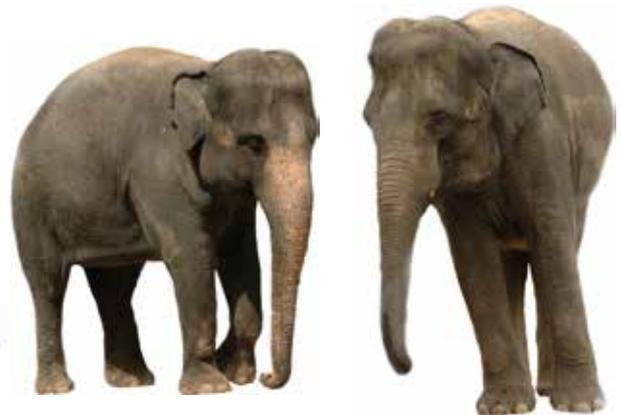
Elephants hate chilli. Farmers in Africa oil ropes with chilli and use them as barriers to keep elephants out of their farms. Chilli bombs, created from burning chilli with elephant dung, are also effective in keeping the giants at bay.



What hot ideas to reduce elephant-human conflict!

### A NEW HOME

In Malaysia, wild elephants that encroach on plantations and villages are captured and translocated to national parks and zoos. This is one way to protect the elephants while ensuring the livelihood and safety of farmers.



Jati and Gambir were translocated from Malaysia to Singapore Zoo.



# FIVE FAIR LADIES @ SINGAPORE ZOO



## KOMALI

### BIODATA

- Female, born in 1970, Sri Lanka.
- The biggest; the matriarch of the herd.
- Prominent pink colouration on the ears and trunk.

### LIKES

- Red apples and Jati

### FILE-FUN FACT

Komali had her tail bitten off years ago by her predecessor, Anusha, when she tried stealing food from the then matriarch.



## JATI

### BIODATA

- Female, born in 1984, Malaysia.
- Has less prominent pink spots and slightly bigger than Gambir.
- Has tushes.

### LIKES

- Collecting saliva in her mouth.
- Loves trumpeting to show her emotions.

### FILE-FUN FACT

Jati has the makings of a matriarch. She always hurries over to settle disputes that arise between other members of the herd.



## GAMBIR

### BIODATA

- Female, born in 1989, Malaysia.
- Has very prominent pink spots on the trunk.

### LIKES

- Kicking rubber balls the keepers make for the elephants.

### FILE-FUN FACT

Gambir loves picking up twigs to doddle on the ground. She is the most playful of our elephants.



## INTAN

### BIODATA

- Female, born on 21 Jan 1995, Indonesia.
- Intan and Aprila are our smallest elephants.
- Has perfectly shaped ears.

### LIKES

- Playing in the water.
- Following Jati around.

### FILE-FUN FACT

Intan means diamond in Bahasa Indonesia. Intan and Aprila have the same father but different mothers.



## APRILA

### BIODATA

- Female, born on 27 April 1995, Indonesia.
- Has a distinct 'fringe' on her head.
- Has pink spots around the neck and on the ankles.

### LIKES

- Hanging out with Gambir.
- Playing chase-me-around with Intan.

### FILE-FUN FACT

Aprila was named after the month she was born in.

photos: fong chee wai



## NO PLACE ON EARTH?

**T**oday, elephants face a problem that plagues countless other animal and plant species. The Earth is getting too crowded. There are over 6 billion people and 20% of them live within or near the range of Asian elephants. The human population is set to balloon further. It is becoming increasingly difficult for humans and elephants to live alongside one another. Good conservation measures that benefit elephants and humans can only be implemented with our support. Visit <https://bit.ly/WRSSupport> to find out more about the elephant conservation project we are supporting. By visiting our parks, you are doing your part to help save elephants.

Neha is the youngest of our elephants. She turned four on 12 May 2020. She lives with her family in Night Safari.





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