

ADELAIDE
ZOO



South East Asian Rainforest



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Acknowledgements

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For the Teacher

General Information

Welcome to Adelaide Zoo!

The Zoo is a great place for learning. Adelaide Zoo Education aims to support student learning by providing resources to assist classes to have educational and enjoyable experiences at the Zoo.

This booklet will provide a range of activities which may be undertaken by your students during their visit to the Zoo. A map and suggested order of activities is provided to give a logical circuit to travel during the visit.

Animal species change from time to time, and sometimes animals are “off limits” or out of sight during visits, so a flexible approach to completion of activities is recommended.

In planning, please consider whether

- ◆ you would like your class to regroup for lunch, animal feeds, the Discovery Zone or at the Entrance at the end of the visit. If so, relay the times and meeting places to students or supervisors (in writing if possible.)
- ◆ you would like to see the Pandas or use the Nocturnal House: if so, book a time when making the Zoo booking so your students are not disturbed by other school groups.
- ◆ you would like a session with a Zoo Education Officer to support your study theme. Lesson requests are met wherever possible, though at busy times of the year you may need to have a few options with dates to enable a time to be negotiated. Again, this time is arranged at the time of booking your class visit.

If your class is not booked in to a program involving an Education Officer, we will attempt to meet your class at the Entrance on arrival at the Zoo. At this meeting the group will be welcomed and given some information about the Zoo to assist their visit. General behaviour expectations will also be outlined.

Specific information relating to this Zoo Trail will follow for the teachers and for adult supervisors. Please ensure that supervisors have a copy of the relevant pages **before they come to the Zoo** so they can also be mentally prepared to maximise the learning for the students in their care.

South East Asia Rainforest - Secondary

TEACHER INFORMATION

This trail is designed for use in the South East Asian Rainforest area of the Zoo, starting on the path at the Malayan Sun Bear end of the walk.

Students are encouraged to work in groups, to discuss their ideas, to use careful observations of animals and their habitat enclosures, to read signage for information on distribution and habits of the animals and to ask questions if Zoo keeping staff are available.

Pre-visit ideas

- Draw a Food Web linking a group of plants and animals (say 15 species) found in a known ecosystem (eg. the Adelaide Hills). Discuss the impact of factors like disease in one species, drought, plentiful rain, an introduced predator etc. on the dynamics of the food web.
- Discuss the relationships between all living things in an ecosystem, and also, between the living things and the non-living environment they inhabit.
- Find out what Biological “HOT SPOTS” are? Locate them on a world map.
- Describe Australia’s biological hot spots.
- Choose 10 food products such as bread, a steak or wine and find the original source of the main raw material. For example, bread - main raw material, wheat, original source wild wheat plants from?
- How is rainforest clearance in Australia threatening our wildlife?
- Does conservation of threatened wildlife only involve breeding them or are there other issues relating to people which must be considered?
- Choose one Threatened rainforest animal and report about the reasons it is threatened, and any programs or conservation actions which are helping its survival.

Suggested animals:

- Golden-lion Tamarin
 - Sumatran Orang-utan
 - Sumatran Rhinoceros
 - Sumatran Tiger
 - Southern Cassowary
-
- Research an animal. Find out about its natural habitat, predators, food source and the adaptations it has to help it survive.
 - Make a list of all the adaptations humans have, compared to say chimpanzees, and how they improve our chances of surviving in our environment.

- Think about trading places with a chimpanzee in the wild, and identify adaptations we would need to be able to survive.
- Group animals into the habitats that they come from, then compare adaptations that they have – looking for similarities and differences.
- The following words and terms would be useful as prior knowledge to your visit to the zoo:
 - Adaptation
 - Environment
 - Habitat
 - Nocturnal, diurnal and crepuscular (active at dusk and dawn)
 - Threatened species
 - Endemic
 - Food Web
 - Ecosystem

Post-visit ideas

- Make a glossary of important words. (Adaptation, Arboreal, Biodiversity Habitat, Ecosystem, Evolution, Endemic, Endangered Species, Extinction etc.)
- Discuss how the class can help contribute to the protection of the threatened species here at the Zoo and raise awareness for the conservation needs of animals in the wild.
- Discuss the kinds of behavioural enrichment used in the enclosures at the Zoo. What are the benefits of the enrichment for the animal and for the visitor?
- Suggest other behavioural and environmental enrichment ideas that Zoo staff and volunteers could develop for particular species in the South East Asia Rainforest area.
- Mark tropical rainforests around the world on a map. Research one of the areas (apart from South East Asia) eg. Africa, Madagascar, Sri Lanka, Australia, New Guinea, Hawaii, Central and South America. Is the rainforest there also disappearing? If so, find out why and list species of animals from the continent/island, which are threatened with extinction.

Links to SACSA framework

Science - Life Systems

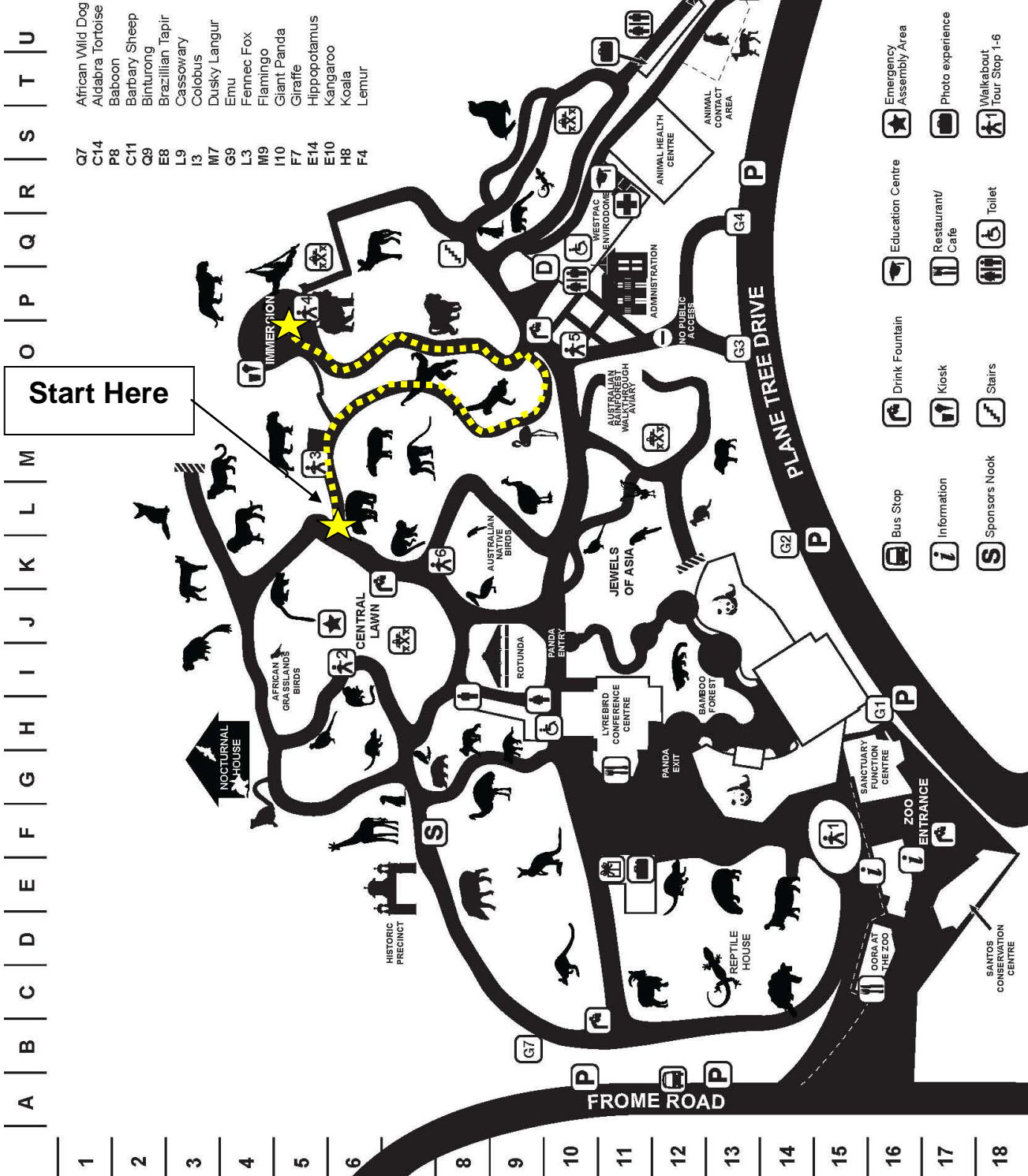
- 3.5 Explains the interrelationships between systems within living things, and between living things in ecological systems. They relate these ideas to the health of individuals and to threats to the sustainability of ecological systems. [F] [Id] [In] [KC1] [KC2]
- 4.5 Investigates and explains the functioning of living systems from the microscopic to the macroscopic. [F] [In] [KC1] [KC2]
- 5.5 Interprets and uses information about the structure and function of living systems and their relationship to survival of ecosystems. [In] [T] [KC1]
- 3.6 Identifies, analyses and communicates confidently the similarities and differences in the ways that living things reproduce, and considers the ethics of related issues. [F] [T] [C] [KC1] [KC2]
- 5.6 Applies theories and conceptual frameworks associated with evolution, biodiversity, genetics, and the cycling of energy and matter in biological and physiological systems. [In] [T] [KC1]

Society and Environment - Place, space and environment

- 3.4 Identifies and describes significant resources, explains the threats which endanger them, and suggests strategies to combat threats. [F] [In] [T] [KC1] [KC2] [KC6]
- 5.4 Analyses and justifies personal views about similarities and differences between regions, in Australia and globally, identifying factors which shape dominant natural, sociocultural, political, economic and environmental contexts. [In] [T] [KC1] [KC2]
- 3.6 Identifies factors affecting an environmental issue, and reports on ways to act for sustainable futures. [F] [In] [T] [KC1] [KC2]
- 4.6 Identifies and describes ways that places and natural environments are valued or threatened, and discusses strategies related to ecological sustainability. [F] [In] [T] [KC2] [KC6]

A | B | C | D | E | F | G | H | I | J | K | L | M | O | P | Q | R | S | T | U | V | W | X | Y | Z

- M3 African Wild Dog
- K4 Aldabra Tortoise
- L11 Lyrebird
- M7 Barbary Sheep
- P6 Binturong
- G7, Q9 Brazilian Tapir
- E12, G6 Cassowary
- L9 Colobus
- I3 Dusky Langur
- M7 Emu
- G9 Fennec Fox
- L3 Flamingo
- M9 Giant Panda
- I10 Giraffe
- F7 Hippopotamus
- E14 Kangaroo
- E10 Koala
- H8 Lemur
- F4
- M3 Leopard
- K4 Lion
- L11 Lyrebird
- M7 Malayan Tapir
- P6 Mandrill
- G7, Q9 Meerkat
- E12, G6 Otter
- M13 Orangutan
- J8 Peccary
- J8 Pelican
- U13 Penguin
- H5 Pheasant
- L12 Quokka
- S9 Sealion
- K3 Serval
- K7 Squirrel Monkey
- L6 Sun Bear
- I6 Tamann
- H9 Tasmanian Devil
- P3, M5 Tiger
- N9 White-cheeked Gibbon
- D10 Wallaby
- R9 Water Dragon
- P10 Westpac Envirodome
- G8 Wombat



Start Here

- Gift shop
- Emergency Assembly Area
- Photo experience
- Westpac Envirodome Discovery Zone

- Education Centre
- Restaurant/Cafe
- Walkabout Tour Stop 1-6

- Bus Stop
- Information
- Sponsor's Nook
- Toilet

- Drink Fountain
- Kiosk
- Stairs

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1 | 2 | 3 | 4 | 5 | 6 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18

South East Asian Rainforest Immersion



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You are now in one of the newer parts of Adelaide Zoo, **the South East Asian Rainforest Immersion area!** This area provides visitors with improved enclosure design and strategically built pathways to put you right amongst the animals. The exhibit has removed a lot of the traditional barriers between animals and visitors as well as providing greater behavioural enrichment designs and items in the animal enclosures. This area of the Zoo includes cultural and environmental features from Sumatra, Indonesia; the part of the world from which these animals originate.

Rainforests – Biodiversity Hotspots of the World!

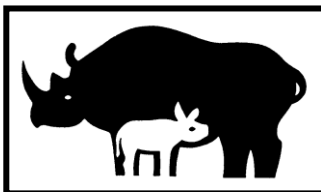
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The diversity of species in tropical rainforests is exceptionally high compared with other habitats around the world. Many rainforest species have remarkable adaptations that assist them to survive and make use of the niches in the rainforest environment. Even small changes to the natural rainforest environment may have severe consequences to its many different plants and animals. One species depends on others and the extinction of one could lead to ecological chain reactions of extinctions.

**Discuss: What is
EXTINCTION?**




*Many of the animals in the Zoo and in the **South East Asian Rainforest** trail are threatened by extinction. Look for this sign on the enclosure graphics. This is the internationally recognised “**Threatened Species**” sign.*



Cylinders – Spin for Knowledge



 Use the 'rotating cylinders', outside *the Malayan Sun Bear lower window*. Spin them around and write down the differences between today and 100 years ago:



	Today	100 Years Ago
Temperature		
Rainfall		
Humidity		

How could changes in temperature, rainfall and humidity have an effect on the 'well being' of the rainforest?



What is the main cause of degradation of the rainforests in South East Asia?



How does rainforest loss or degradation threaten the species that live there?



Malayan Sun Bear – The World’s Smallest Bear!

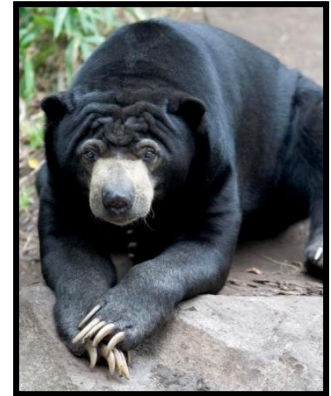
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The Malayan Sun Bear is the world’s smallest bear and can be approximately 120 – 150 centimetres long, stand about 60 centimetres tall and weigh between 25 and 65 kilograms. The common name “sun bear” derives from the golden “O” shaped markings on its chest.

It is also called the “*dog bear*”....

Explain why you think it got that name?





?

Little is known about the Sun Bear’s natural history and distribution, but scientists have determined that it is a **threatened species** and that the population is still declining. The Sun Bear can be found in the lush tropical rainforests of South East Asia. The diet of a Sun Bear consists of a large variety of rainforest fruit, vegetation, insects and other small animals. Active mostly at night-time (**nocturnal**) the Sun Bear’s adaptations include large claws (picture above) to climb and a long tongue (picture below) to eat fruit and honey up in the trees.

The name of the Sun Bear in Malayan is “*basindo nan tenggill*” which means “*he who likes to sit high*”



Consider what you have learnt about the status of the present South East Asian Rainforest – why do you think the Sun Bear is a threatened species?





Another key threatening process to the survival of the Sun Bear are its uses in **Asian medicine and food**. Different parts of the animal such as the *gall bladder* are used to develop medicines that have **no proven medical or healing effect**. Some parts of the animal are even worth more on black markets than illegal narcotic drugs such as heroin. In addition to this, people often keep Sun Bears as pets. This requires killing the mother bears in order to get hold of cubs that are young enough to be tamed.

Gram for gram, a dried bear gall bladder can sell for 18 times the price of gold!

What can you do to stop the poaching and killing of the Malayan Sun Bears in the wild?





Dusky Leaf Monkey and Siamang Gibbon

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The Dusky Leaf Monkey and Siamang Gibbon are both primates. They have forward facing eyes, flexible fingers, arms and legs to assist them in their arboreal lifestyle. Their flexible body structure and specialised body parts allow them to move swiftly from branch to branch in the rainforest. Their movements and excellent judgment of distance and depth is assisted by their forward facing eyes. The movement of the Siamang through trees, where one hand goes over the other hand, is called **brachiation**.

ADAPTATION!

The Siamang Gibbon has long arms and two fingers on each hand fused together to help their grip when brachiating...



Identify one major difference between the Dusky Leaf Monkey and Siamang Gibbon body structures.



?

Apes, which include **gorillas, chimpanzees, orang-utans and gibbons**, are in many ways very much like humans. They have a high level of intelligence, the same basic body structure and they are known to have complex social behaviour. Over time humans and apes evolved in different directions, but there is strong evidence for a shared common ancestor.

**Chimpanzees and humans
have 98-99 percent of their genetic material
in common**



What structural differences are there between humans and Siamang Gibbons? Find at least 2 different features.

Hint: Look at body parts and compare them to your own!





The importance of primates to the rainforest

The dense and tall rainforest allows little sunlight down to the ground and the trees need help to spread and disperse their seeds to areas where there might be more light. Siamang Gibbons and Dusky Leaf Monkeys are **frugivorous** animals which mean that they eat rainforest fruits. The seeds are carried away in their bodies and dispersed across their large territories allowing new seeds to grow and regenerate the rainforest.

What is the greatest threat to survival of these primates?



The Sound Of Nature!



If you arrive at the Adelaide Zoo in the morning, (sometimes in the afternoon as well), you could be witness to a loud and impressive territorial "concert", with the Siamang Gibbons at centre stage. In the wild, calling is a response to a disturbance and is used mainly to defend the territory. Calling is also frequent when there is an abundance of food in the rainforest.



Territorial concert!



Look for the large "gular sac" which is a throat pouch on the Siamang gibbons' necks (picture above)
This can be inflated to the size of its head, allowing the Siamang to make loud resonating calls or songs.
Calling can be heard over 3 kilometres away...

Sumatran Tiger

The smallest of all tigers still hanging on...



Fill in the blank spots in the text about the Sumatran Tiger.

Hint: Read the signage!



The **critically endangered Sumatran Tiger** is 1 of 5 remaining sub-species (types) of tigers in the world today. It is found in lowland forests, mountain forests, and tropical South East Asian _____ . It is **endemic** to the island of _____ in



Indonesia and in the wild no more than _____ individuals remain.

The low number of Sumatran Tigers is _____ due to deforestation and poaching. Tigers have been exterminated on the neighbouring islands of Bali and Java in Indonesia. Further loss of _____ and _____ could result in the same fate in Sumatra for a species that has lived there for over one million years.



What do you think ENDEMIC means?

What adaptations, structural and behavioural, can you see that help the Sumatran Tiger survive in the rainforest?



Name some other animals at the Adelaide Zoo that use camouflage to either hunt or protect itself from being hunted?



The Swimming Cat!

?

The Sumatran Tiger has acute hearing and hunts prey patiently on its own. It has rarely been found to cooperate with other tigers to gather food, which may be the reason that 9 out of 10 hunting attempts fail. The Sumatran Tiger has webbing between its toes and is considered to be a great swimmer, unlike most cat species which avoid water.



How could the Sumatran Tiger use this unusual trait to help it catch prey?



Trick of nature!



Can you see the white spots that look like “eyes” behind the Sumatran Tigers’ ears? These spots are known as “eye spots” or “predator spots” and help protect the Sumatran Tiger and its cubs from other predators.

What other animals here at Adelaide Zoo do you know that use a similar “trick?”



The Sumatran Orang-utan

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The Orang-utan is the only great ape in the wild that is endemic to Asia. The others (Gorillas, Chimpanzees and Bonobos) come from Africa. The Indigenous people of Indonesia and Malaysia call this animal “**Orang Hutan**” which means “**People of the Forest.**” Despite its large size the orang-utan is highly adapted to a life in trees where it can find all it needs to survive. Orang-utans also create and use tools to help forage for food and water high up in the trees.

Leaves are chewed into a sponge to help soak up trapped water...



What are some adaptations of the orang-utans which assist its arboreal lifestyle?

- 1 _____
- 2 _____
- 3 _____

The orang-utan is the largest tree living mammal in the world!

Humans - The orang-utans' Worst Enemy!

?

Orang-utans are the most critically endangered of the great apes, due to poaching and habitat loss caused by population growth and logging. Scientific research and statistics suggest that Sumatran Orang-utans will be extinct in the wild within 10 years!

How could individuals in Australia help prevent this happening?

Hint: Read the signage...

- 1 _____
- 2 _____

?

“Behavioural and Environmental Enrichment” are very important for Zoos and other places where wild animals are kept in captivity. The enrichment aims to encourage animals to behave in ways that are considered “normal” in the wild.

You have now gone through the South East Asian Rainforest trail. Can you remember any types of Behavioural Enrichments that you have noticed on your walk?



Can you identify any aspects of the tiger and orang-utan enclosures that would enrich the behaviour and environment of these animals?



Food Web for the SE Asian Rainforest

There are thousands of species of plants and animals living in the SE Asian rainforest. You have seen some of the larger mammals that live in this part of the world.

Can you construct a simple food web in the space below using the following species?

Fig Tree
Toadstool
Lichen
Grass
Earthworm

Cockroach
Termite
Bee
Spider
Carrion fly

Peacock
Eagle
Dusky Leaf Monkey
Siamang

Axis Deer
Sumatran Orang-utan
Sumatran Tiger
Malayan Sun Bear

