



Same planet. Different world.

# GRADE 6



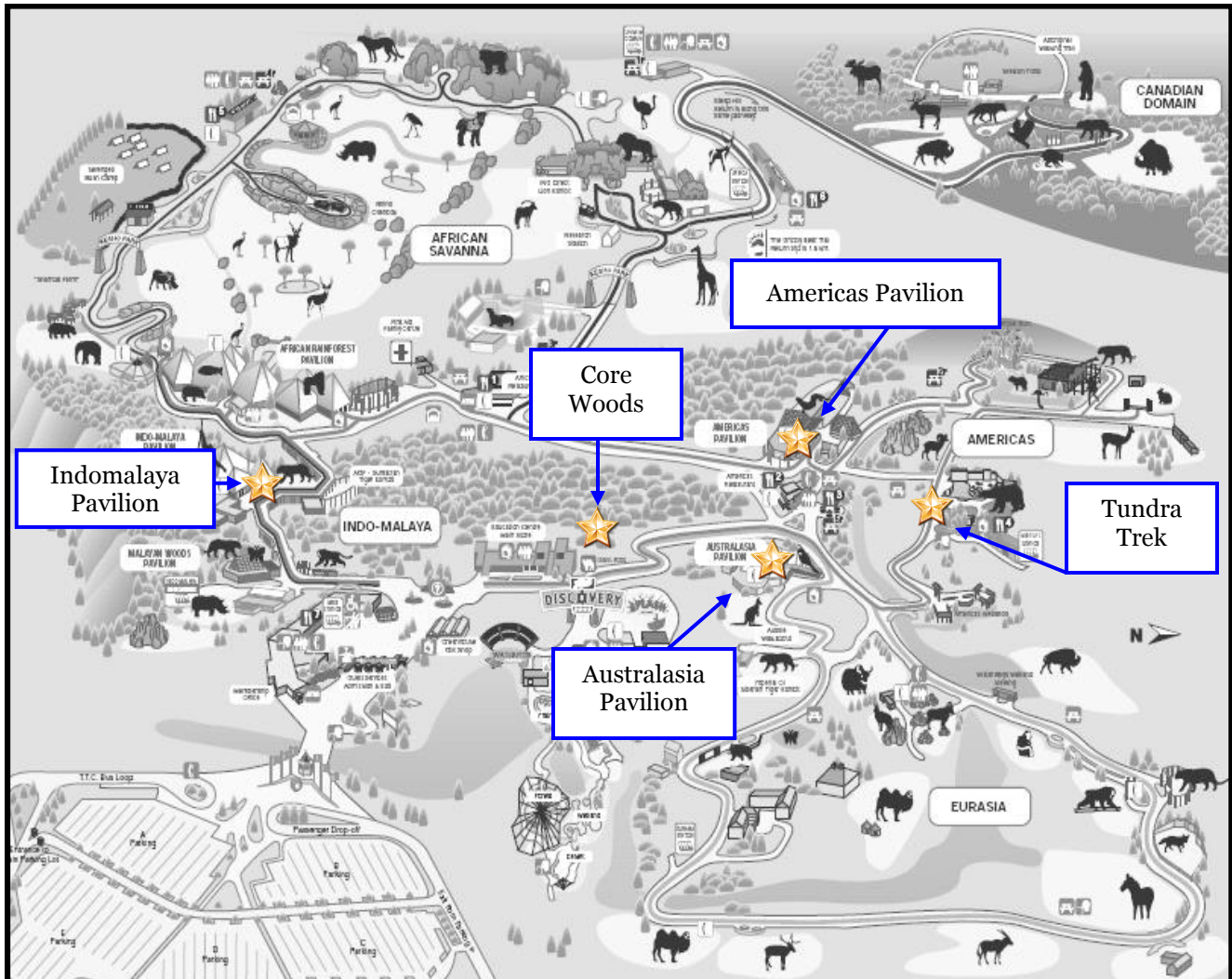
## CLIMATE CHANGE AND BIODIVERSITY SELF-GUIDED TOUR

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## Site Map

★ = Stops on your tour



### Grade 6 Curriculum Objectives:

- Assess human impacts on biodiversity, and identify ways of preserving biodiversity.
- Investigate the characteristics of living things, and classify diverse organisms according to specific characteristics.
- Demonstrate an understanding of biodiversity, its contributions to the stability of natural systems, and its benefits to humans.

## INTRODUCTION

*The following discussion outlines suggested topics for review prior to visit.*

### Conservation

- The Toronto Zoo is heavily involved in the conservation of a wide number of animal and plant species. Conservation refers to the protection and preservation of plants, animals, and their environment or habitat.
- During your visit to the Zoo, you will encounter many species which are currently endangered and may be a part of different conservation programs which function to restore the species population. What is the difference between an endangered species and an extinct species?
  - Endangered species are those who are in immediate danger of extinction. Examples include Siberian tigers, gorillas, Sumatran orangutans, and coral reefs.
  - Extinct species no longer exist in any part of the world. Examples include dinosaurs, the dodo bird, and the Galapagos amaranth.
- **H.I.P.P.O** is an acronym that represents five main factors that can lead to the endangerment or extinction of an animal or plant species:
  - H** = Habitat Loss
  - I** = Introduced Species
  - P** = Pollution
  - P** = People
  - O** = Over collection / Overharvesting
  - *Habitat loss* is defined as the destruction of a species' specialized environment thereby rendering it functionally unable to support the species population. For example, the destruction of the Amazon rain forest for agricultural purposes which results in the species being forced to abandon their homes.
  - An *introduced species* refers to bringing in a new species to an unfamiliar environment which may have a detrimental effect on the stability of the habitat. For instance, the introduction of cane toads in Australia to control the cane beetle population; this is currently resulting in the near extinction of some indigenous wildlife.
  - *Pollution* is the introduction of contaminants into an environment that can lead to irregularity and chaos within both the habitat and species populations. Examples of pollutants include oil spills, surface runoff, waste dumping, and thermal pollution.

- The excessive growth of the *human population* has led to decreases in natural resources, food, land, and water resources which subsequently has had a devastating effect on the planet and its organisms.
- *Over collection* (also known as overharvesting) is the process in which humans exploit natural resources through mass farming, over fishing, and excessive deforestation, to just name a few.

## Biodiversity

- Refers to the variety of living things in a habitat or community
- During our tour of the Zoo, we will focus on biodiversity - the amazing variety of living things that surround us – as well as the classification of vertebrate animals.
- *Taxonomy* refers to the classification of organisms based on different characteristics.
- The different classification levels are as follows: *Kingdom, Phylum, Class, Order, Family, Genus, and Species*. The sentence “Kings play chess on fine grained sand” may help you to remember the order of the levels of classification.
- Kingdom is the broadest level of classification. The members of each group become smaller and smaller as the classification becomes more specific. For example, there are less organisms belonging to the Class *Aves* (all birds), than to the Kingdom *Animalia*. The different classes found within the Kingdom *Animalia* that we will observe at the Zoo include Class *Scyphozoa* (True jellyfish), *Arachnida* (Arachnids), *Actinopterygii* (Ray-finned fishes), *Amphibia* (Amphibians), *Reptilia* (Reptiles), *Aves* (Birds) and *Mammalia* (Mammals).
- Let’s take a look at the breakdown of avian classification from Kingdom to Class:
  - Kingdom: *Animalia*** (all animals belong to the Kingdom *Animalia*)
  - Phylum: *Chordata*** (a more specific group of animals, including vertebrates)
  - Sub-Phylum: *Vertebrata*** (chordates with back bones)
  - Class: *Aves*** (*Aves*, a more specific group of vertebrates)
- Animals in various classes possess different characteristics that allow them to inhabit different environments. Consider the homes of a salmon and a raccoon. What are some challenges to inhabiting their environments?
  - The salmon resides in an aquatic environment. It possesses gills for respiration, fins for locomotion, a streamlined body shape to reduce water resistance, and has scales to protect from predators.
  - The raccoon resides in a terrestrial habitat. It possesses lungs for respiration, limbs for locomotion, and has thick fur to protect against the elements.
- The *habitat* is the type of environment where an animal or plant species lives. Habitats can vary from aquatic (freshwater or marine) to terrestrial (tropical, desert, tundra, grassland, wetland, etc.). Habitats consist of many components including space, shelter and the availability of water and food. Without any one of these components, what do you think would happen to the species?
  - If a species did not have access to space, shelter, food or water in their habitat they would not survive.
- Within a habitat species maintain a particular role which is defined as a *niche*. For example, the beaver creates a dam which functions both in housing and creating downstream wetland areas. The beaver dam reduces the flow of water resulting in the formation of wetland habitats.

- Considering a wetland habitat, what are some different animal and plant species that can be found there?
  - A few examples include frogs, turtles, salamanders, insects, fishes, and birds such as the Great blue heron, etc.
  - Cattails, bulrushes, common duckweed, and water lilies, etc.
- Species also have special characteristics which allow them to be successful in their habitat, these are termed *adaptations*. Consider a hummingbird which has a very long thin beak to drink nectar from flowers versus a blue jay which has a short strong beak to crack nuts. Each bird has physical characteristics that allow them to be better suited for survival in their habitat.

### Interdependence

- *Interdependence* is the idea that everything in nature is connected to everything else; what happens to one plant or animal also affects other plants and animals.
- An example of interdependence is a *food chain*. In a food chain all organisms are essential to the survival of the others. Food chains always begin with plants because they create their own food through the process of photosynthesis (they are known as producers). Herbivores, carnivores and omnivores are all known as consumers because they cannot produce their own energy. The difference is that herbivores only eat plants, whereas carnivores only eat meat and omnivores eat both meat and plant matter. The final link in the food chain consists of decomposers, which are bacteria that break down dead organic matter. The following diagram is a linear representation of a food chain.

Sun (light energy) → Plant (producer) → Herbivore (Consumer) → Omnivore/Carnivore (Consumer) → Bacteria (Decomposer)

Terrestrial example: Sun (light energy) → Grass (producer) → Sheep (Consumer) → Wolf (Consumer) → Bacteria (Decomposer)

Aquatic example: Sun (light energy) → Algae (producer) → Daphnia – tiny crustacean (Consumer) → Gudgeon fish (Consumer) → Small mouth bass (Consumer) → Humans (Consumer) → Bacteria (Decomposer)

### Climate Change

- Any changes in modern climate can be referred to as *climate change*. Today there are research studies that suggest the temperature of the Earth may be increasing. This is thought to be due to both natural causes such as warming during an interglacial period and from the increased release of human-made greenhouse gases through the burning of fossil fuels.
- *Global warming* is a commonly used term that represents the increase over time of the average temperature of Earth's atmosphere and oceans.
- Changes in the climate can alter the habitat of a species so the organism is forced to compensate for these changes, otherwise their survival could be threatened.
- During our tour of the Zoo, you should consider the differences between the habitats of captive animals versus their wild counterparts, including factors such as climate, predation, resource availability, pollution, and species interaction.


## TOUR

### Core Woods

- The core woods function as a habitat for a variety of indigenous wildlife within the Zoo. Looking at the woods, what types of plants and animals would you expect to reside here?
- Many migratory birds travel through these woods because they are a part of the Rouge Valley which forms a corridor from the North down to Lake Ontario.
- How many species of trees do you think are present within these woods? There are very few species of trees present, with the majority being one species, the maple.
- Since we have such a small diversity of trees here, one disease could decimate our tree populations. In comparison, the rich biodiversity of trees in the rainforest help protect them from disease.

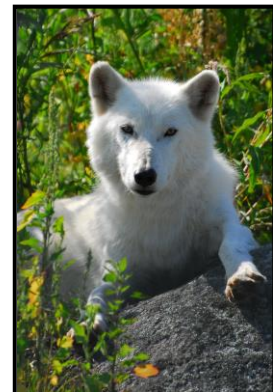
### Tundra Trek

#### Polar bear

- Polar bears are mammals and a top carnivore of the arctic. The remains of seal kills left unconsumed by bears are likely an important source of food for younger, less-experienced polar bears
- 
- Living in the arctic, polar bears need *adaptations* to survive in their habitat, including a thick layer of subcutaneous fat which functions in insulation and buoyancy.
  - Looking at the polar bears, what do you think is the colour of their skin? Polar bears actually have black skin underneath their fur; this allows the skin to better absorb heat from the sun.
- What do you think is the colour of a polar bear's fur? The fur is completely transparent; however the reflection of the sunlight causes the fur to appear white, much like snow and ice.
  - In the wild, polar bears rely heavily on the formation of sea ice for hunting seals. If this ice does not form or forms too late in the season this can cause the polar bears to starve. Thus a warmer climate can negatively affect polar bears by contributing to *habitat loss*.

#### Arctic wolf

- As the name suggests, Arctic wolves reside in Arctic regions and as carnivores they prey on a variety of large and small mammals including deer, musk ox, bison and birds.
- Arctic wolves are mammals that live in packs of 7-10 animals and similar to what we saw with polar bears, these wolves are covered in thick fur.



- The fur of these wolves is actually white and allows the wolves to blend into their environment acting as camouflage. Without a snowy terrain, arctic wolves would be more visible to their prey and their hunting success would decrease.

### Snowy owl

- These carnivorous raptors (birds of prey) inhabit the Arctic regions and primarily feed on lemmings, mice voles, rabbits, birds and fish.
- The breeding patterns of these owls are *interdependent* on the lemming population so that decreases in the lemming population will lead to decreases in the number of eggs laid by these owls.
- What differences can you observe between the male and female snowy owls? The male is full white whereas the female has dark brown markings on their feathers.
- Why do you think the male owl is completely white? This aids in camouflaging the animal for hunting purposes.
- These owls have another interesting *adaptation* to cope with their cold climate, can you spot it? The thick covering of feathers present on their legs and toes keeps their feet warm.

### Reindeer

- Reindeer are mammals that inhabit the arctic tundra and evergreen forest areas and as herbivores feed mainly on lichen, a fungal-like growth that is able to withstand the arctic environment.
- Reindeer affect the biodiversity of their *niche* as lichen carpets can be easily destroyed by reindeer through overgrazing and trampling.
- Predators of reindeer include large animals such as bears and wolves.
- These animals grow antlers which are made of bone and are covered with a highly vascular skin known as velvet. This supplies oxygen and nutrients to the growing bone. Both male and female reindeers shed their antlers every year. Can you see the velvet?
- Reindeer grow extra long hooves which have tufts of hair contained between them and can be compared to snowshoes. Can you guess their function? The long hooves and hair act to prevent the reindeer from sinking into the snow.



### Lesser snow geese

- The Snow Goose is a member of the Class *Aves* (bird) and is the most abundant goose in Canada, ~ 2 million and rising. This goose is also found in northern Greenland, Alaska, and the northeastern tip of Siberia
- The changing climate has allowed geese to expand their habitat range into new areas in the Eastern arctic (Baffin Island).
- These animals are an important food source for some Northern people, however the large population can cause problems through the depletion of their natural resources which also affects other species. Furthermore, overpopulation in a small area

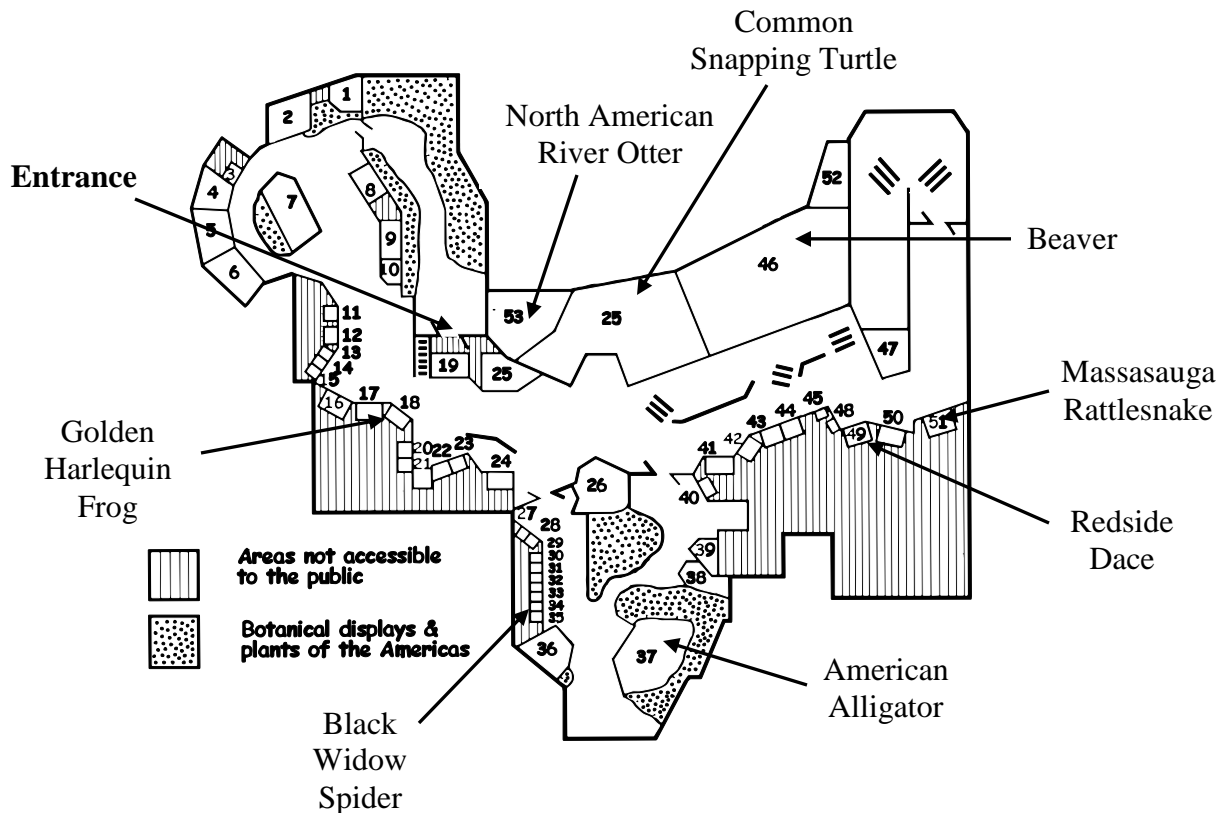


increases the risk of disease outbreaks amongst the geese population (avian cholera).

### Arctic fox

- Arctic foxes are a member of the Class *Mammalia* and inhabit the northern regions of North America, Eurasia, Greenland and Iceland.
- What similarities can you observe between the Arctic fox and the Arctic wolves we saw earlier? As you may have noticed, the Arctic foxes have thick fur, small ears and muzzle, as well as short legs, all of which are *adaptations* that aid in preventing heat loss to the environment.
- We learned earlier that Arctic wolves have white fur year round, however, the fur of Arctic foxes actually changes to a two-tone brown in the summer months.
- These animals are opportunistic carnivores, this means that they eat anything available if their favourite food sources are limited. Arctic foxes have been known to eat squirrels, birds, voles, eggs and even berries!
- Threats to these animals include habitat destruction, hunting by humans, and similar to other animals, their hunting range is dependent on the populations of their food sources.

### Americas Pavilion



### Golden harlequin frog

- This amphibian ingests mainly crickets as well as some other insects. It is originally from Panama in South America, however, it is no longer found in the wild.
- This species of frog has been severely affected by a fungus called *chytridiomycosis* (Chytrid fungus) as well as habitat loss.
- At the Zoo these frogs are involved in breeding programs in hopes of re-establishing their population.



### North American river otter

- These carnivorous mammals inhabit North American regions and feed primarily on aquatic organisms including fish, crustaceans and frogs.
- Unfortunately, otters have been virtually eliminated through many parts of their range, especially due to pollution and habitat destruction around heavily populated areas in the mid-western and eastern United States.
- Otters spend equal amounts of time in both their terrestrial and aquatic habitats but most of their hunting occurs in the water.
- Otters are well suited to spending time in an aquatic environment considering they have webbed feet, which are useful in propulsion through the water, and their fur is waterproof which is beneficial because the otters frequently move from land to water and back again.
- Look at the body shape of the otters and consider your body movements when you are swimming, can you think of any comparisons? The sleek, streamlined body shape and very agile spine allows the otters to move very quickly and smoothly through the water. Humans try to mimic these characteristics by keeping their arms and legs close together and elongating the body.



### Black widow spider

- This animal is classified under the phylum *arthropoda*, class *arachnida*, as opposed to the previous animals we have seen today which were all classified under phylum *chordata*. Can anyone guess the main difference between these phyla? Phylum *chordata* contains animals with an internal skeleton, whereas the phylum *arthropoda* contains animals who possess an exoskeleton (these animals wear their skeleton on the outside!).
- The black widow creates its own habitat wherever it spins its web, much like humans who build their houses wherever they please. The species found at the Zoo is native to the United States and Mexico.
- These carnivorous invertebrates feed on beetles and caterpillars and play an active role in controlling the insect populations in their environment.

- If threatened, the black widow will bite, injecting venom into its attacker. This venom is a neurotoxin and is 15 times more toxic than the venom of a rattlesnake!
- There is an interesting fact that relates to the difference in population amongst adult male and female black widows. Can anyone guess? After mating the female black widow devours the male, thereby providing nutrients for the female as well as ensuring that she becomes impregnated by the sperm of that particular male. That sounds appetizing!

### American alligators

- This carnivorous animal belongs to the class *reptilia* and inhabits swamps, rivers, marshes and ponds where it feeds on rodents, fish and other reptiles.
- The American alligator is considered to be a *keystone* species which means that it has a very important role in the environment. These animals help control prey populations and also create habitats which are necessary for the survival of other species. For example, red-bellied turtles incubate their eggs in old alligator nests.
- Alligators frequently hunt underwater, what type of *adaptation* do you think would be necessary for this activity to be successful? Consider what you would use to see underwater? Alligators possess a third eyelid which is a clear membrane that covers their eye and allows them to see underwater, this can be compared to goggles!
- Another adaptation that aids in hunting is the location of the eyes and nostrils on the upper portion of their head. This allows alligators to perform “sneak attacks” by remaining almost completely submerged in the water while waiting for unknowing prey to approach the water.

### Common snapping turtle

- This omnivorous reptile feeds on small fish as well as young and adult ducks. They reside in aquatic habitats and spend most of their time at the muddy bottom.
- Snapping turtles are very aggressive animals and are rarely preyed upon as adults, however, eggs and hatchlings are eaten by several larger animals including herons, racoons, skunks, bull frogs, and foxes.
- Humans pose a small threat to these animals as they are frequently used in Native ceremonies and consumed as food in stews and soups.
- As aquatic animals, snapping turtles have webbed feet that aid in propulsion through the water and have their nostrils facing upwards to enable them to breathe air while remaining almost completely submerged.



### Beaver

- This herbivorous mammal inhabits ponds, rivers, and streams and creates large dams to live in. Look inside the beaver lodge/dam, what purposes do you think it serves? The lodge functions as a home for the beavers providing protection during sleep and the raising of offspring.
- Some other functions of the beaver dam are to create *habitats* for various other species, maintaining and controlling the water level, and preventing flooding and

erosion. All of these factors contribute to the beaver being a *keystone* species, similar to the alligator we saw earlier.

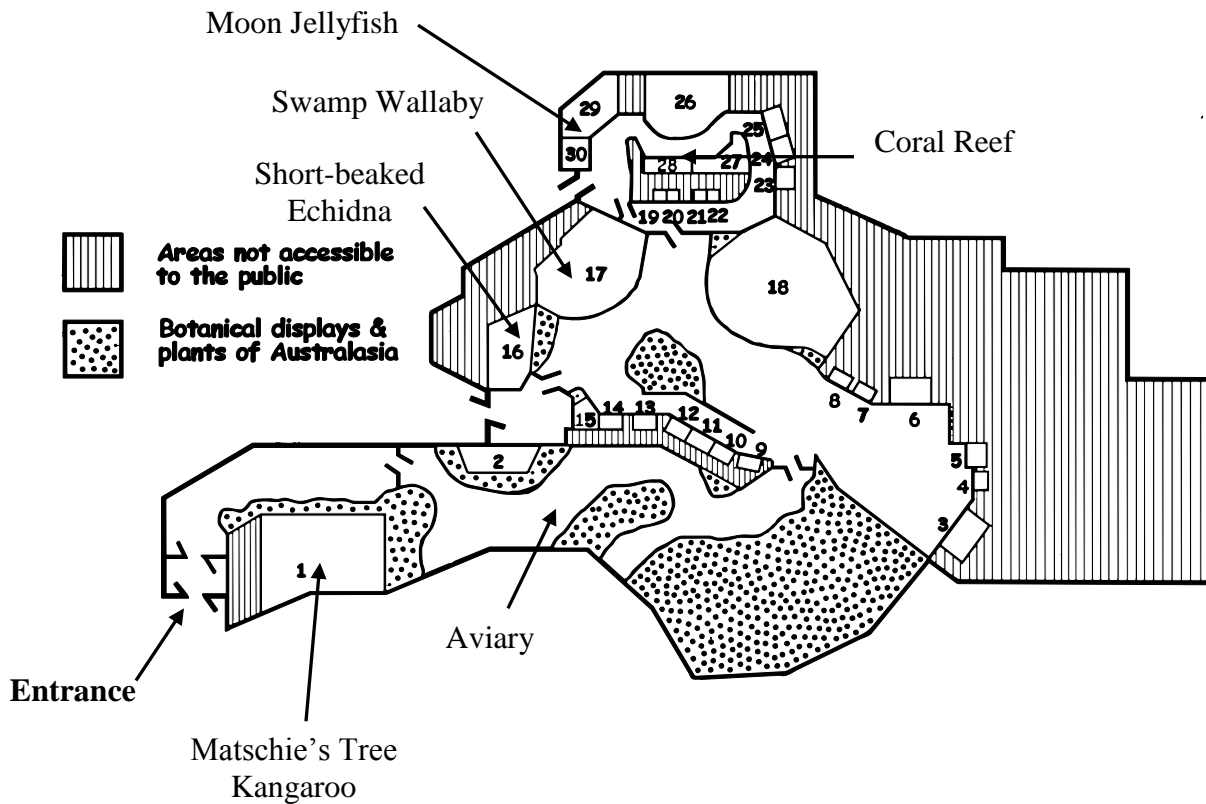
- Beavers feed on a variety of trees including aspen, birch, and poplar.
- Considering beavers spend much of their time in the water, can you think of any *adaptations* that would be beneficial to these animals (Hint: remember the alligator)? Beavers possess valves within their ears and nose that prevent water from entering these openings. They also have a membrane which covers their eyes and protects them from the aquatic environment.
- Threats to these animals consist of destruction of their habitat, water *pollution*, loss of food resources due to deforestation, and predation by large mammals such as wolves, foxes, bears, otters, and lynx.

### **Massasauga rattlesnake**

- This carnivorous reptile inhabits swampy wetlands and woodlands and feeds on mice, frogs and small birds. These snakes possess heat sensitive pits located on either side of their face, what do you think these are used for? This is an adaptation that allows the snake to detect warm blooded animals in the dark.
- These snakes possess hinged fangs which inject venom into their prey to prevent the blood of the animal from clotting. Can you spot the fangs?
- Look at the rattle on the snakes tail, what do you think it is made of? The rattle is composed of enlarged scales and each time the snake sheds its skin a new segment is added to the rattle. What do you think it is used for? The rattle is used to warn off danger when the snake feels threatened.
- Some threats to this animal include habitat loss and the misguided fears of humans who feel they need to kill the rattlesnakes to protect themselves.
- The Zoo offers workshops twice a year to educate cottagers and other people on ways to identify and avoid these snakes.

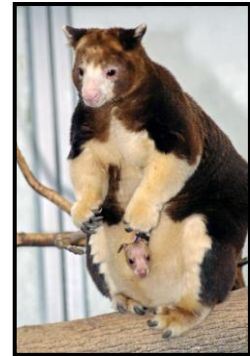


## Australasia Pavilion



### **Matschie's tree kangaroo**

- This herbivorous mammal is found within Papua - New Guinea and is a specialized type of mammal known as a marsupial. Does anyone know what is special about marsupials? Marsupials are mammals that raise their young in a pouch located on their abdomen. Can you give an example of another type of animal that is also a marsupial? Wallabies, koala bears, wombats, and opossums.
- Benefits of the pouch include protection for the young marsupial and the location of nursing. The animal can continue to enter the pouch to nurse until it can feed on its own or the mother says it is time to move out!
- These animals have large clawed nails that are useful in climbing and also rely on their long tail to aid in balance.
- These animals are threatened and are hunted for their flesh by man.



### **Aviary**

- As we enter the pavilion, look around at the variety of plants within the aviary. These are representative of rain forest areas in Australasian regions which are home to a large number of wildlife species.

- Although Australia is known for its outback regions, the small rain forest region is home to over half of the continent's butterflies, birds, and ferns, and a third of the mammal species.
- Compare the plant diversity in this aviary to that seen in the Core woods. Is there a difference? Yes, the diversity within the aviary is much greater than the Core woods. How do you think a greater diversity in plant life would affect animal life? The greater the variety of plants, the greater variety of animal species that can inhabit the area. This explains the greater variety of Australian wildlife found in the small rain forest region as opposed to the large outback region.



### Short-beaked echidna

- This omnivorous animal is another specialized type of mammal found within Australia. Echidnas are monotremes, this means that they are mammals who lay eggs! (Imagine if you were born within an egg, it would have been less work for your parents!) A female echidna lays 1 or 2 eggs and deposits them into her pouch. Inside, the eggs will hatch and the offspring will remain within the pouch until they are finished developing.
- Can anyone spot the echidna? The echidna is a nocturnal animal which means they are active during the night. If you cannot see the echidna it is probably sleeping behind a log in the exhibit.
- Although echidnas lay eggs, they are warm-blooded, possess hair, mammary glands, and a four chambered heart. These characteristics define them as mammals. Do you think humans also possess these characteristics? Yes!
- As you have seen with the Matschie's tree kangaroo and the echidna, Australia has some very unique mammals! This is because Australia and nearby islands are isolated, surrounded by ocean, and the animals cannot travel to or from the land masses. These interesting animals can only be found in Zoos outside of Australasia.

### Swamp wallaby

- This is another example of a herbivorous marsupial. Like the tree kangaroo, the wallaby also has a pouch for carrying its young.



- Consider some differences in physical appearance between the wallaby and the tree kangaroo. Can you name a few? The tree kangaroo stays mainly on all fours, has large claws to aid in climbing and a low set long tail that can help it to balance on tree limbs. The wallaby stays upright standing on its hind feet, uses its tail for balance when hopping and kicking, and has a large difference between the size of the fore and hind legs.

### Coral Reef

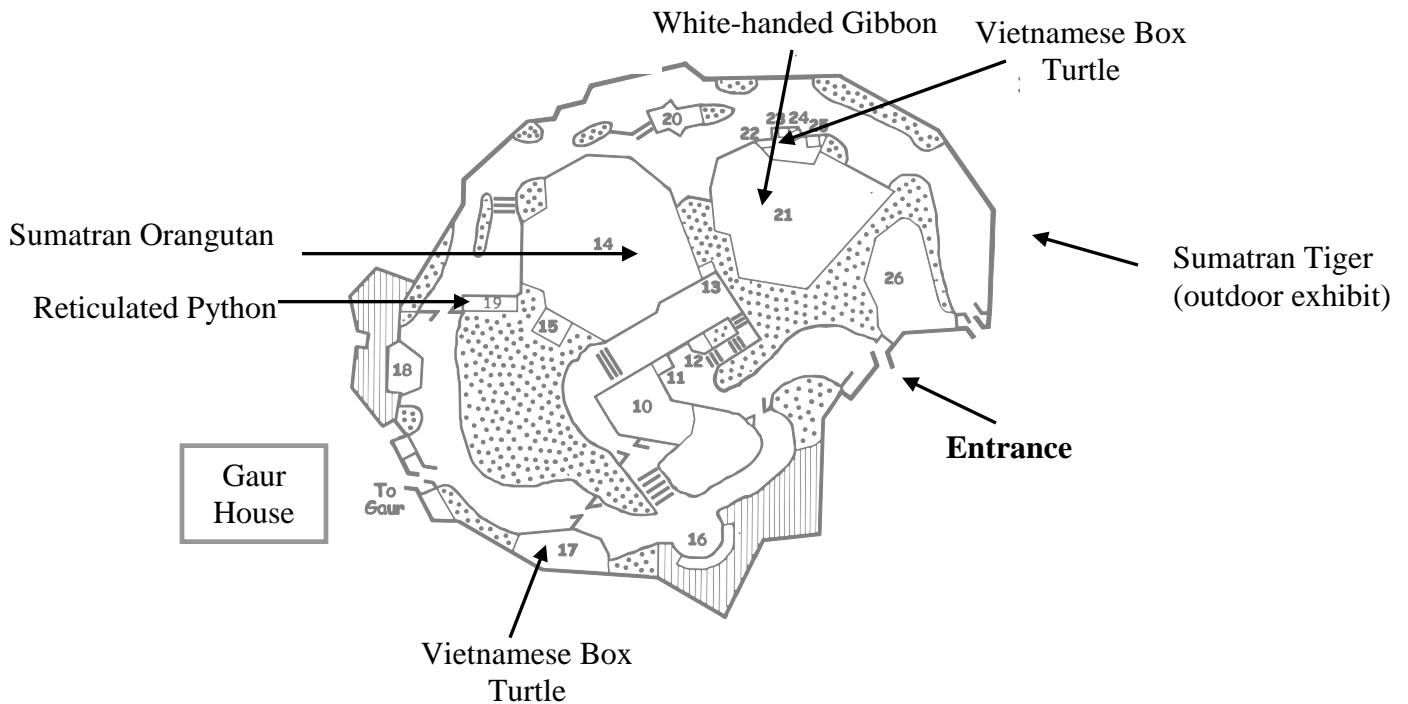
- Coral reefs represent a tiny proportion of the world's ocean waters, and yet they are a *habitat* to nearly a quarter of all marine species. The organisms that live on the reef provide food and the beautiful colours that you can observe.

- The Great Barrier Reef off the coast of Australia is home to over 400 species of corals, and is the largest coral reef on the planet. Do you think corals are plants or animals? Corals are animals that secrete an exoskeleton which forms the solid part of the reef that you are looking at in this exhibit.
- The Great Barrier Reef is currently endangered due to the sensitivity of the reef organisms. Water pollution, and human activities such as scuba diving, and fishing boats all pose as threats to the survival of the reef.
- Specific regions of the Great Barrier Reef are protected and prohibit threatening activities. Destruction of this ecosystem will result in the extinction of a wide variety of tropical animals and will greatly decrease the biodiversity of the planet. This could mean no more Nemo!

### **Moon jellyfish**

- These beautiful animals are invertebrates meaning they have no internal skeleton or backbone. They belong to the phylum *Cnidaria* and the class *Scyphozoa*. These animals feed by catching organisms with their long tentacles and then moving the organisms towards their mouth, which is located at the centre of the underside of their bell shaped body.
- You just learned the location of the jellyfish's mouth, can you guess the location of its bum? The bum is actually the mouth of the jellyfish, all materials enter and exit through this opening.
- You might be wondering whether these jellyfish can sting. The answer is yes, their tentacles possess tiny stingers which are used to stun and capture prey.
- Do you think the jellyfish has a brain? Jellyfish actually possess nerve nets which are exactly like they sound; a collection of nerves that form a net within the entire body of the animal. These nerves function in integrating sensory information and allowing the animal to control its movements and any physical processes.

## Indomalaya Pavilion



### **Vietnamese box turtle**

- The Vietnamese box turtle is an omnivorous reptile that inhabits wetlands in Vietnam, Laos, Cambodia, and China that feeds on many plants, mushrooms and insects.
- This turtle reaches sexual maturity by 4-5 years of age, and can live up to 30 years in the wild. These animals have a low reproductive rate and only produce 1-3 eggs per clutch (refers to all of the eggs produced at one time), and a maximum of 6 eggs per year.
- The sex of the un-hatched turtle is temperature dependent and as global temperatures rise, this can have a negative effect on the turtle population by causing the development of more females than males. Consider if this was the case with humans, all babies born in warm climates such as Africa and South America would be females! That would definitely cause some population problems!
- This animal is *critically endangered* and threats include consumption as a food source, illegal pet trade and *habitat loss*.

### **Reticulated python**

- This carnivorous reptile inhabits tropical rainforests located in Southeast Asia where temperatures range between 26.7-33.3°C. These animals are heavily dependent on water and so can often be found near ponds and rivers.
- One threat to this species includes *people* hunting them for their skin, hundreds of thousands of reticulated pythons





are killed and skinned each year, raising doubts about the long-term sustainability of this species.

- Would you believe that this snake can open its mouth wide enough to eat a goat? It's true! Through disarticulation, snakes are able to open wide and stretch out the elastic connective tissue on their mandible (lower jaw).
- Just like we do, snakes need to be able to breathe while they eat, but with such a huge mouthful, how is breathing possible? While eating, a special tube is exposed in the snake's mouth which allows for air exchange.
- Looking at the colouration of the snake's skin, where do you think this snake lives in the rainforest? This python resides on the ground and along branches and is called "reticulated" due to the complex design on the snake's skin which is an *adaptation* that serves as an effective camouflage in these areas.

### Sumatran orangutan

- Orangutans are omnivores meaning that they eat both plant and animal matter. They enjoy fruit, leaves, nuts, shoots, insects, and sometimes birds and small mammals.
- These mammals inhabit the lowland rainforests of Sumatra and are defined as a *keystone* species. They play an integral role in the dispersion of seeds and pruning of vegetation.
- Threats to these animals include habitat destruction through deforestation, hunting for the bush meat trade, illegal pet trade, and uncontrolled forest fires.
- The Sumatran orangutans are protected and are known as an umbrella species. This means that not only are they themselves protected, but so is their environment and all other organisms that reside there.
- Orangutans are quite similar to humans, so similar that we can actually transmit diseases to them! For example the influenza virus, tuberculosis, and intestinal parasites can all be transferred between both species.



### White-handed gibbon

- These animals are frugivores, which mean that they consume only fruit and play an important role in seed dispersal, much like the orangutans we saw previously.
- Gibbons are arboreal mammals and have several adaptations for feeding. One of them is brachiating locomotion, which involves swinging from branch to branch by their arms. This style of motion allows them to reach the periphery of the tree canopy, where most of their food is found.
- Gibbons form mated pairs, this is where the male and female coexist for their entire lifespan producing multiple offspring. There is some evidence of "divorces," where the male or female leaves his or her mate for no obvious reason and mates with another individual.
- Similar to the orangutans, threats to these animals include hunting, the illegal pet trade, deforestation and uncontrolled forest fires.
- Laws are in place to protect against live capture of these gibbons, but unfortunately are rarely enforced.

## Sumatran tiger

- These mainly carnivorous mammals inhabit the tropical rainforests of Sumatra feeding on large mammals, reptiles, fish, birds and sometimes berries. These animals are a top predator and help control the population of large herbivores in their environment.
- As top predators, Sumatran tigers have many *adaptations* that aid in hunting including retractable claws, camouflaging coats, large cup-shaped ears that focus sounds, excellent eyesight, and the ability to swim very quickly.
- Threats to these endangered animals include *habitat loss*, deforestation, elimination



of natural prey, and illegal poaching. Which parts of the animal do you think are taken after poaching? Furs for rugs and wall hangings and bones for use in traditional medicines, although there is no evidence supporting the validity of these medicines.

- Tigers can eat up to 85 pounds of meat in one sitting (that is like eating you and half your friend!) and they normally only catch 1 out of every 10 animals they hunt.

## CONCLUSION

### Sample Discussion Questions

- What are some examples of habitats that we observed today? Compare your habitat and note any similarities or differences to any one of the habitats. (Try to impress upon the students that they reside in a specific habitat and occupy a niche).
  - Freshwater aquatic, marine aquatic, rainforest, grasslands, forests, wetlands, woodlands, tundra, and desert (Australian outback).
- Thinking back to all the organisms we observed today, what are some of the most pervasive threats that are jeopardizing the existence of all animals on the planet?
  - Examples include habitat destruction, deforestation, pollution, human habitat expansion, and human activities such as illegal hunting, illegal poaching, overfishing, over consumption of limited natural resources, etc.
- As global temperatures rise what are some effects that will be detrimental to the existence of some of the animals we saw today?
  - Rising temperatures can prevent the formation of sea ice which hinders polar bear hunting and can lead to starvation. Snow geese boundaries can expand leading to overpopulation and the depletion of natural resources.
  - Reproduction can also be affected by changing temperatures. We saw this with the Vietnamese box turtle where the sex of un-hatched turtles is temperature dependent. The Redside dace are a species that reproduce within a small temperature range and can also be negatively affected by rising global temperatures.

- Try classifying the following animals in terms of Kingdom, Phylum and Class: Amur tiger, snowy owl, reticulated python, black widow spider, and moon jellyfish.
  - Sumatran tiger: Kingdom *Animalia*, Phylum *Chordata*, Class *Mammalia*.
  - Snowy owl: Kingdom *Animalia*, Phylum *Chordata*, Class *Aves*.
  - Reticulated python: Kingdom *Animalia*, Phylum *Chordata*, Class *Reptilia*.
  - Black widow spider: Kingdom *Animalia*, Phylum *Arthropoda*, Class *Arachnida*.
  - Moon jellyfish: Kingdom *Animalia*, Phylum *Cnidaria*, Class *Scyphozoa*.