



Same planet. Different world.

GRADE 4



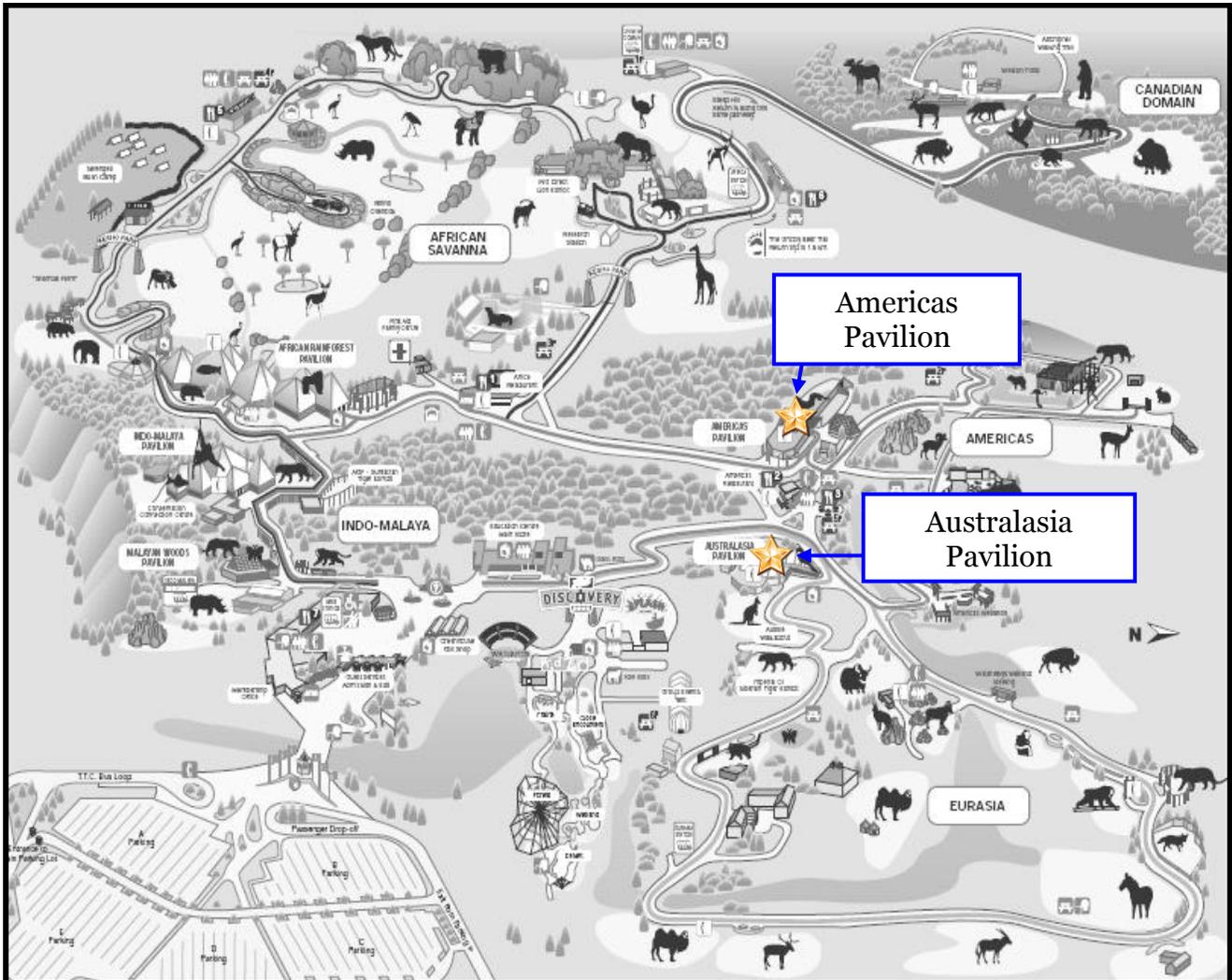
ANIMAL HABITATS AND COMMUNITIES

SELF-GUIDED TOUR

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Toronto Zoo Site Map



★ = Stops on your tour

Grade 4 Curriculum Objectives:

- Analyze the effects of human activities on habitats and communities.
- Investigate the interdependence of plants and animals within specific habitats and communities.
- Demonstrate an understanding of habitats and communities and the relationships among the plants and animals that live in them.

INTRODUCTION

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

Habitat

- During our tour at the Zoo, we will be learning about how animals live together in different habitats and communities.
- What does the word *habitat* mean? A habitat is where a plant or animal lives. For example, a giraffe's habitat would be the African Savanna. A red-footed tortoise's habitat would be the Brazilian rainforest. What might a fish's habitat be?
- Plants and animals cannot simply live anywhere. For an organism to survive in its habitat, four things must be present. What are these four things? In order for a plant or animal to survive in its habitat, food, water, shelter, and space must all be available.

Community & Symbiosis

- An animal's habitat differs from its *community*. What is a community? A community includes all of the living things in one defined area.
- What plants and animals form a pond community? The wetlands pond at the zoo has many different community members, including grasses, trees, water insects, frogs, snakes, turtles, crayfish and many more!
- Plants and animals are interdependent, which means that they depend on each other for survival.
- Within communities, some species have very special relationships with others called *symbiotic relationships*. The word *symbiosis* means "living together", and there are different kinds of symbiotic relationships that plants and animals share. We will see two types of symbiotic relationships at the Zoo:
 - *Mutualism* is when two species living together both benefit from each other. For example, butterflies and flowers both benefit from their relationship since butterflies are able to get the nectar they need, while they assist plants in reproduction by pollination.
 - *Commensalism* is a symbiotic relationship in which one species benefits, but the other is unaffected. What is an example of commensalism? A sloth living in a tree benefits from the tree as it remains safe from predators. The tree, on the other hand, is not really affected by the sloth.

- A third type of symbiotic relationship is *Parasitism*, in which one species benefits but the other is negatively affected. One example is of ringworm on mammals. This fungus needs nutrients from the animal's skin to survive, but it is itchy and annoying to the animal.
- We will see examples of mutualism and commensalism at the Zoo.

Niche & Food Chain

- Plants and animals each have a role in their habitat called their *niche*. An organism's niche is defined by what it does, such as where it lives, what it eats, what *eats it*, and when it's active. For example, the niche of a butterfly is to take nectar from plants, pollinate plants, provide food for birds, and so on.
- Niches are limited by other organisms living in the same region (for example, not *every* mammal in one area can eat only plants because there might not be enough food/plants for all the animals to survive).
- There are three categories of niches that exist in each community: *producers*, *consumers*, and *decomposers*.
- What is a producer? Producers make food. Green plants use photosynthesis to create and store food. This is the base of the food chain.
- What is a consumer? A consumer eats other living things. What are some examples of consumers? People are consumers!
- What is a decomposer? Decomposers get their food by breaking down dead plants and animals. What are some examples of decomposers? Worms, bacteria, and fungi are all decomposers.
- All creatures are linked in a *food chain*. As mentioned, producers form the base, or first step, in a food chain. What is an example of a food chain? One example is: grass – vole – bird of prey.

Adaptation

- This is an important term. An adaptation is a feature or behaviour which helps a plant or animal survive in its habitat and fulfill its niche.
- What are some adaptations that Canadian animals have? Since it can get very cold, some mammals, like rabbits, grow thicker winter coats to stay warm. Others like caribou, migrate to find food. Polar bears have black skin and clear, hollow fur which allows them to absorb heat from the sun.
- We will look at many plant and animal adaptations as we tour the Zoo.

Plants, animals, and people are interdependent

- Now that we've learned a little bit about plant and animal communities and their niches (roles) within them, we can see that different species are interdependent on each other for their survival.
- We have not yet discussed the role of humans. Humans can, and do, have a large impact on wildlife habitats and communities in both negative and positive ways. How people treat the wildlife around them can lead to, or prevent, *extinction* of different species.
- What does *extinction* mean? Extinction is when a certain species no longer exists anywhere. Dodo birds are one example. This species lived on an island in the Indian Ocean. When people started to inhabit the island they brought

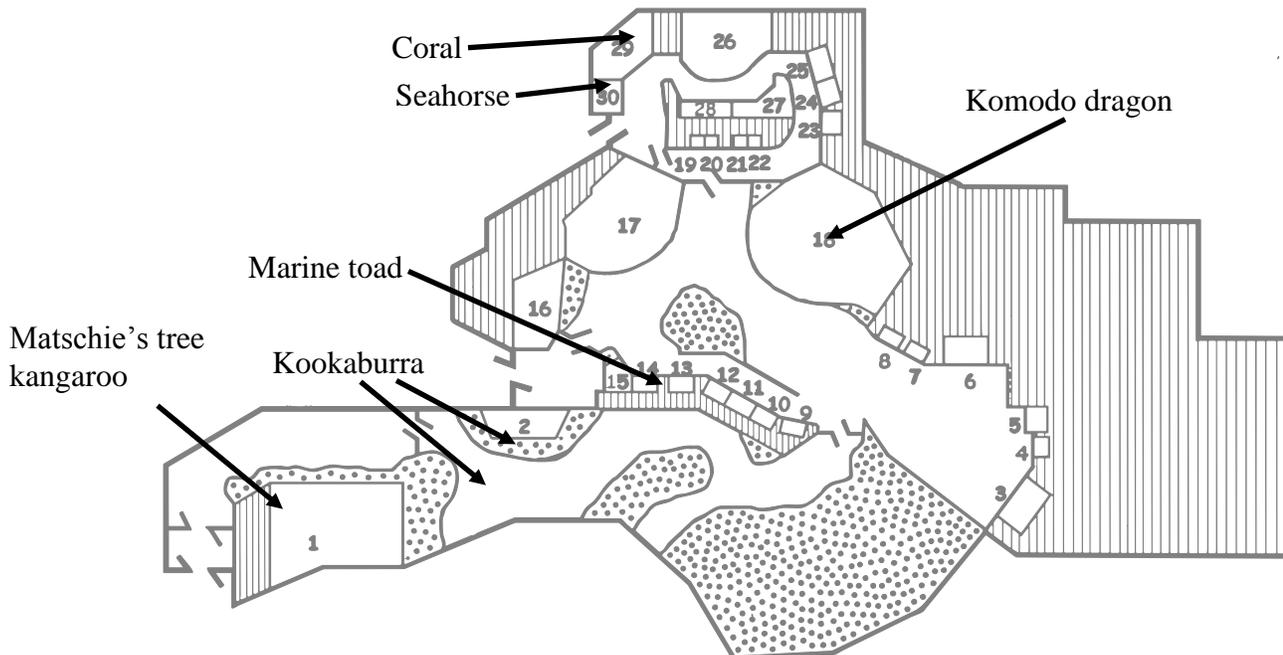
mammals (like dogs, cats, and pigs) with them. These mammals, as well as hunting, were responsible for the extinction of the dodo bird, which can no longer be found anywhere in the world.

- What are some activities that people engage in which may cause animals to be in danger of becoming extinct? Destruction of habitats, pollution, extensive trapping or hunting, introduction of invasive species (such as with the dodo bird), and many other activities may push animals toward extinction.
- Animals which are in danger of becoming extinct are said to be *endangered*. A plant or animal is considered endangered if its population decreases by more than half in ten years, or if there are less than 2500 alive, or less than 250 that are mature enough to reproduce and continue the species.

TOUR

The following tour will guide teachers and students in an exploration of two Toronto Zoo pavilions: Australasia and Americas.

Australasia Pavilion





Matschie's tree kangaroo

Habitat

- Tree kangaroos live in the rainforest canopy (high in trees) where they are safe from predators.
- These animals live in Papua New Guinea, near Australia.

Niche

- The roles of a tree kangaroo are to live in trees and eat vegetation such as leaves, fruit, and flowers.
- Tree kangaroos provide food as they are prey for pythons, harpy eagles and dingos.

Adaptations

- What might the tree kangaroo use its long tail for?

The tail is an adaptation which allows these animals to be well suited to arboreal life (living in trees). They use their large tails for balance while climbing.

- Look at the tree kangaroo's paws. Do you see another adaptation for climbing? They have large claws for hanging on.

Human Relationships

- Tree kangaroos are a *threatened* species. The term 'threatened' describes a species that is not yet endangered, but may become so in the future. Their status is a result of human activities. People hunt these animals for meat. Additionally, humans engage in *habitat destruction*, by clearing forests for logging, and mining. The survival of tree kangaroos depends on the survival of forests.



Kookaburra

(in walk-through aviary past tree kangaroos)

- Look up! Can you find this bird? It is usually sitting high up in the trees.

Habitat

- Kookaburras live in clearings and at the edges of forests.

Niche

- Describe the niche, or role, of the kookaburra:
 - Is this animal a producer, consumer, or decomposer? Kookaburras are consumers.
 - What do they eat? Kookaburras eat rodents, insects, frogs, and other small animals.
 - Where do kookaburras nest? They nest in hollowed trees and tree stumps.
 - What might eat a kookaburra? Kookaburras provide meals for birds of prey like owls and eagles.

Adaptations

- These birds use a loud call to defend their nests and territory. When they call, it sounds like loud laughter.



Marine toad

Habitat

- These animals are able to survive in a variety of habitats, from grassland to swamp to forest. They are native to Central and South America, which might make you wonder: why are they in the Australasia Pavilion? Here's why...

Human Relationships

- In 1935, Marine Toads were introduced to Australia to aid in pest control efforts against the cane beetle which was eating crops.
- In their native habitats, marine toads would have predators such as certain caiman, eels, cat-eyed snakes, and water monitors. In their new regions, they had no natural predators. Their populations were therefore able to grow out of control.
- Marine toads are threatening Australian wildlife. They are competing with native animals for resources like food and space.
- Further, marine toads are poisonous. They have two glands at the sides of their heads which allow them to release a toxin when they feel threatened. This toxin kills some of the animals that attempt to prey on the marine toad.
- Marine toads are now attempting to fill their usual niche in a new setting, disrupting and threatening the previously established wildlife communities.
- The marine toad is an example of an *invasive species*. An invasive species is a species of plant or animal that is not native to the community, and has a negative effect on native plants and animals. Invasive species are a *huge* cause of animal endangerment and extinction around the world.



Swamp wallaby

Habitat

- Swamp wallabies live in Eastern Australia, and are often found around Eucalyptus forests or places with a lot of vegetation.

Niche

- What do swamp wallabies eat? They are herbivores, meaning that they eat only plants.
- Wallabies and kangaroos fill the niche of grazers in Australia, instead of hoofed animals like on other continents. (*kangaroos can be seen outside the pavilion exit*).

- Wallabies are prey to eagles, dingoes, and foxes.

- Wallabies are marsupials. This means that once babies are born, they crawl up into a pouch on their mother's stomach. The mother provides milk and nourishment for the babies. As they grow larger, they will begin to explore the outside world a little bit at a time. Once they are old enough to live on their own, the young leave the mother.

Komodo dragon

Habitat

- Komodos live on the Komodo Islands. The land varies from forest to savanna.

Niche

- Describe the Komodo dragon's niche:
 - Is this animal a producer, consumer, or decomposer? Komodo dragons are consumers. They are carnivores, eating only meat. They will also scavenge for food, eating dead animals.
 - Komodos fill the niche of carnivores on the island. Their large size is due to this lack of competition – they can acquire all of the resources they need to grow big and strong.
 - Komodo dragons provide food for other Komodos! Adults will readily eat young dragons.
 - Komodos have a symbiotic relationship with bacteria that live in their saliva. The komodos are unharmed by it, but an animal receiving a Komodo bite will often succumb to it.



Adaptations

- As mentioned, older Komodos will eat babies. Young Komodos generally stay in trees to keep safe, but occasionally must come down for food. When they do so, they are at risk of attack. To make themselves less appealing to hungry adults, they roll around in feces!
- Komodos' teeth are perfect for their diet – they have serrated edges to help tear apart meat. They even grow new teeth when others fall out! There can be four to five replacement rows of teeth ready to go.

Coral

Habitat

- Many species of coral live in warmer ocean waters, attached to hard surfaces.
- Most corals do not live in water any deeper than 46 metres, and prefer clearer water. Why is this? Corals need sunlight to survive. If the water is too deep or murky, the light won't reach them.

Niche

- Corals eat plankton and very small fish.
- Many species of coral have a symbiotic relationship with tiny algae. The algae's habitat is in the tissue of the coral. While the algae gain a home, they also give the coral energy to grow. Algae further remove carbon dioxide from the water around the coral, allowing the coral to develop and grow its skeleton of calcium.
- Plants like sea grass and mangrove forests also have a symbiotic relationship with coral. These plants help to secure sediment in its place, and stop it from washing over and eventually killing the coral. At the same time, the coral shield the plants from erosion caused by incoming waves.
- In these two examples of symbiotic relationships, both the coral and other species it interacts with benefit. What kind of symbiotic relationships are these? Both of these relationships are examples of mutualism.



Seahorse

Habitat

- Seahorses live in shallow salt waters with lots of plant life such as sea grasses or mangrove trees.

Niche

- What do seahorses eat? Seahorses eat plankton, fish, and brine shrimp.
- Sea horses provide food for crabs and some large fish that prey on them, but in general they have few predators, likely due to very effective camouflage.
- Seahorses have a symbiotic relationship with sea fans, a type of coral. Seahorses grip onto the sea fan and remain very still. They are well hidden among the fans, providing them protection from predators. The sea fan is neither benefited nor harmed by the sea horse. What kind of symbiotic relationship is this an example of? The seahorse and sea fan are engaging in commensalism.

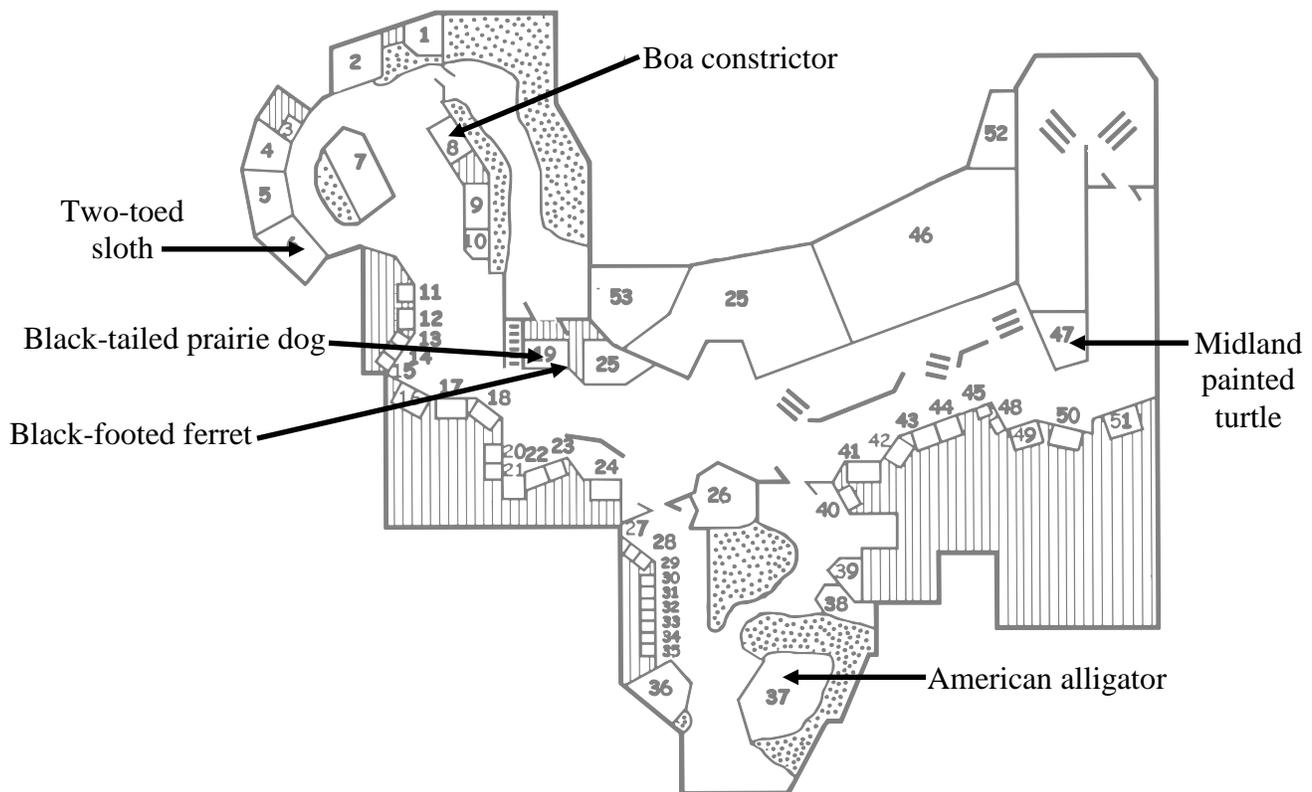
Adaptations

- As mentioned, the seahorse camouflages very well with the sea fan. What helps it to do so is its ability to change colour. In only a few minutes, seahorses can change their colour to match their surroundings.
- Staying very still doesn't just help the seahorse hide from predators; it also helps it to hide from prey. Seahorses are *ambush predators* meaning that they stay very still until potential prey comes near, and then attack by surprise. This is similar to the hunting method of many large snakes.

Human Relationships

- Seahorses face threats from human activities. They are collected from the wild for many uses. Seahorses are sold as pets; or dried to sell as souvenirs. Some cultures believe that seahorses have medicinal qualities, and catch them for this purpose.

Americas Pavilion



Boa constrictor

Habitat

- Where do boa constrictors live? Boas live in South American rainforests.

Niche

- Describe this animal's niche:
 - What do boas eat? Boas eat small animals like mammals, birds, and lizards. They are therefore carnivores, and have the niche of consumers.
 - Like seahorses, boa constrictors are *ambush predators* meaning that they stay still and use their markings to camouflage, while waiting for unsuspecting prey.



- What would eat a boa? Large mammals like forest cats might eat the boa. Birds will also eat young boas.
- When is this animal active? Boas are *nocturnal* meaning that they are active at night and hide during the day. This helps them to be able to sneak up on their prey.

Adaptations

- Boas have a unique adaptation for hunting at night. While it may be difficult to see their prey with their eyes, they have heat sensitive pits around their lips, which allow them to sense warmth and locate warm-blooded animals around them.
- Do you see an adaptation that might protect this animal from predators? Look at the snake's colour and pattern. Its appearance helps it to camouflage in leaf litter on the ground, allowing it to hide from possible danger. The pattern also helps the snake conceal itself from unsuspecting prey.

Two-toed sloth

Habitat

- How would you describe the sloth's habitat? Sloths live in the forest.
- These sloths are native to Central and South America.

Niche

- Their role is to eat mainly plants, but also some animal matter like insects.
- They are prey and therefore provide food for larger carnivores like jaguars and ocelots.
- Sloths also provide a habitat for some animals, like mites and insects which live off of algae that grow on the sloth's fur!
- Sloths have a symbiotic relationship with the algae on their fur. We know already that the sloth's fur provides a place for the algae to live and grow, but how might the sloth benefit from this? The green algae provide camouflage for the sloth. This relationship is one of mutualism, since both species benefit from each other.
- As we learned earlier, commensalism occurs in a symbiotic relationship where one animal benefits, while the other is unaffected. Small insects have such a relationship with sloths. They benefit from the sloth as the algae provide them with nourishment, while the sloth is neither helped nor harmed.



Black-tailed prairie dog

Habitat

- Black-tailed prairie dogs live in the prairie grasslands of North America.

Niche

- The black-tailed prairie dog fills a vital niche in its community.



- These animals are a *keystone species*. This means that they play an important part in sustaining their communities. If they were to become extinct, other species would also be in danger.
- To understand why black-tailed prairie dogs are so important, we need to learn a little bit about their niche, or role in the prairie ecosystem:
 - Black-tailed prairie dogs graze on vegetation. By clipping grasses, and also defecating, they allow a greater variety of vegetation to grow. This in turn benefits other grass-eating animals.
 - Prairie dogs burrow underground. Numerous animals such as rabbits, snakes, black-footed ferrets, burrowing owls, and insects use prairie dog burrows for shelter.
 - By digging, the prairie dogs also turn the soil, again helping plant life.
 - Finally, black-tailed prairie dogs are a food source for carnivores like black-footed ferrets, foxes, and coyotes.
- Without the black-tailed prairie dog, these communities would be missing an important member! The next exhibit on our list is the black-footed ferret: the perfect example of what happens when a keystone species disappears.

Black-footed ferret

Habitat

- Black-footed ferrets once lived throughout the Great Plains - grasslands from Saskatchewan, through the United States, to Mexico.

Human Relationships

- This mammal was at one point believed to be extinct, and is considered one of North America's most endangered mammals. At one point in history, *no* wild populations remained. People are largely responsible for the loss of these animals.



- Ferrets depend on prairie dogs for survival. As we learned, black-tailed prairie dogs are a keystone species. Ninety percent of the black-footed ferret's diet consists of black-tailed prairie dogs. Black-footed ferrets also inhabit black-tailed prairie dog burrows. They raise their young in these burrows, and use them for shelter.
- While clearly beneficial to wildlife, black-tailed prairie dogs have been seen as pests by people. Eradication programs were developed to rid farmland of prairie dogs.
- In addition to the systematic slaughter of prairie dogs, ferrets (and prairie dogs) were further threatened by loss of habitat, as grasslands were converted into farmland.
- While this example demonstrates how people's activities can have a very negative impact on wildlife, it also shows that ordinary people *can* make a difference.
- Numerous organizations, including the Toronto Zoo and Parks Canada, are working toward re-establishing wild black-footed ferret populations through

captive breeding and re-introduction, conservation, and education programs. Later in 2009, the first Canadian re-introduction will occur in Grasslands National Park, Saskatchewan. Wild populations have already been successfully re-established in parts of the U. S. and Mexico.

American alligator

Habitat

- Where do alligators live? Alligators live in water like swamps, ponds, and marshes in the South Eastern United States.



Niche

- Describe an alligator's niche:
 - Alligators are large carnivores

What animals do they eat? Alligators eat small animals like rats, fish, and other reptiles.

- Alligators don't usually provide food for other animals as they are at the top of the food chain in their swampy habitats. Occasionally, a Burmese python will take on an alligator. These pythons are not native to American alligator habitats, rather, they are an invasive species. People may purchase Burmese pythons as pets and release them to the wild when they cannot adequately care for them, or grow tired of them. As we saw with the marine toad, introduced species disturb the food chain and can have a negative impact on the ecosystem.
- Alligators provide gator holes for other animals. Alligators create a depression by clearing away vegetation and shifting dirt. This depression fills with water, becoming a pool. Gator holes provide habitat for fish and turtles, and drinking water for animals like birds and deer. The muddy banks provide a perfect place for lush vegetation to grow, attracting more animals. This is a symbiotic relationship: the animals gain water and a place to live, and the alligator can eat some of them!
- Alligators also have the role of controlling populations of rodents. If animals like rats become too numerous, they can threaten other species. By preying on rats, alligators help to eliminate this issue.
- Are alligators producers, consumers, or decomposers? Since they eat other animals, alligators are consumers.

Adaptations

- Look at the alligator's head and face. Do you notice any features which may help the alligator survive in its habitat? The location of the eyes and nostrils are a beneficial adaptation. They allow the alligator to peer out of the water and breathe while it's body is submerged.
- Alligators have another adaptation which helps them underwater, although it is difficult for us to see. Alligators have a membrane that closes over their eyes while swimming, which enables them to see underwater.

Human Relationships

- In the 1970s, American Alligators were considered an endangered species. They were hunted by people for their skins, meat, sport, and captured for pets. Habitat destruction was a further threat to the species.
- Through the work of wildlife organizations, government, and commercial alligator farms, the species was saved and able to make a comeback. Farming these animals provided an alternative to hunting, and also allowed controlled captive breeding for release into wild populations.

Midland painted turtle

Habitat

- Where is this turtle's habitat? Midland painted turtles live in ponds in Southern Ontario.

Niche

- Describe the turtle's niche:
 - Painted turtles eat both plants and animals.
 - While adult turtles may be difficult to eat due to their hard, protective shell, hatchlings and eggs provide food for animals like raccoons.
 - Turtles help to maintain healthy water environments for other life, by eating vegetation and deceased animal matter. If these items were left to rot in the water, bacteria would grow and oxygen levels would decrease.



Human Relationships

- Human activities threaten turtles in Ontario. As urban populations encroach on wildlife, pests such as raccoons follow. Raccoons thrive because they have easy access to food sources such as garbage. Meanwhile, their populations threaten native species like turtles. Raccoons eat turtle eggs and hatchlings. This predation is devastating to turtle populations as turtles take many years to grow and become mature. In order for turtles to reproduce, they have to live to maturity. Threats to young turtles make reproduction difficult to achieve.
- Another manmade threat to native turtle species are invasive species. We've already learned about the impact on the alligator caused by people releasing pythons into swamps, and the danger Australian wildlife is in due to the introduction of the marine toad. These turtles are in a similar situation.
- Ontario wetlands have become home to red-eared sliders, a common pet turtle native to the southern United States. Pet owners sometimes release unwanted turtles into ponds, likely not knowing what effect they can have. These turtles then compete with native species for food and space. Red-ears are aggressive turtles, and often eat only meat. They have no natural predators here, further threatening the balance of native ecosystems. Finally, whenever an animal is introduced to a new community, there is always a possibility that it can bring with it foreign disease which may be dangerous to native species.

CONCLUSION

Sample questions for discussion

- What are some examples of animals and their habitats that we saw today?
 - American alligators live in water like swamps, ponds, and rivers.
 - Two-toed sloths live in trees in forests.
 - Corals live in warmer salt waters where sunlight reaches them.
 - Midland painted turtles live in ponds and wetlands in Ontario.
 - Etc...
- Do plants and animals within specific communities depend on each other?
Yes!
- We saw that people can have an effect on habitats and communities. What are some examples?
 - People introduce invasive species, such as Burmese pythons, red-eared sliders, and marine toads which disturb ecosystems.
 - Habitat destruction caused by logging and mining threatens communities where some animals, like tree kangaroos, live.
 - Hunting or capturing of animals for food, entertainment, or medicine, such as with tree kangaroos, alligators and seahorses.
 - People eradicate “pests” such as prairie dogs, which are keystone species in their communities.
 - People can also *help* wildlife. We saw examples of captive breeding and re-establishment of wild populations with the black-footed ferret, and initiatives by many groups to bring back American alligators.
- What are some examples of species we saw today that have symbiotic relationships that help each other?
 - Two-toed sloth and algae.
 - American alligator and wetland wildlife.
 - Coral and plant life (mangrove forests, sea grass).
 - Coral and algae.