toronto zoo

Self-Guided Tour

Grade 3

Plant and Animal Interactions

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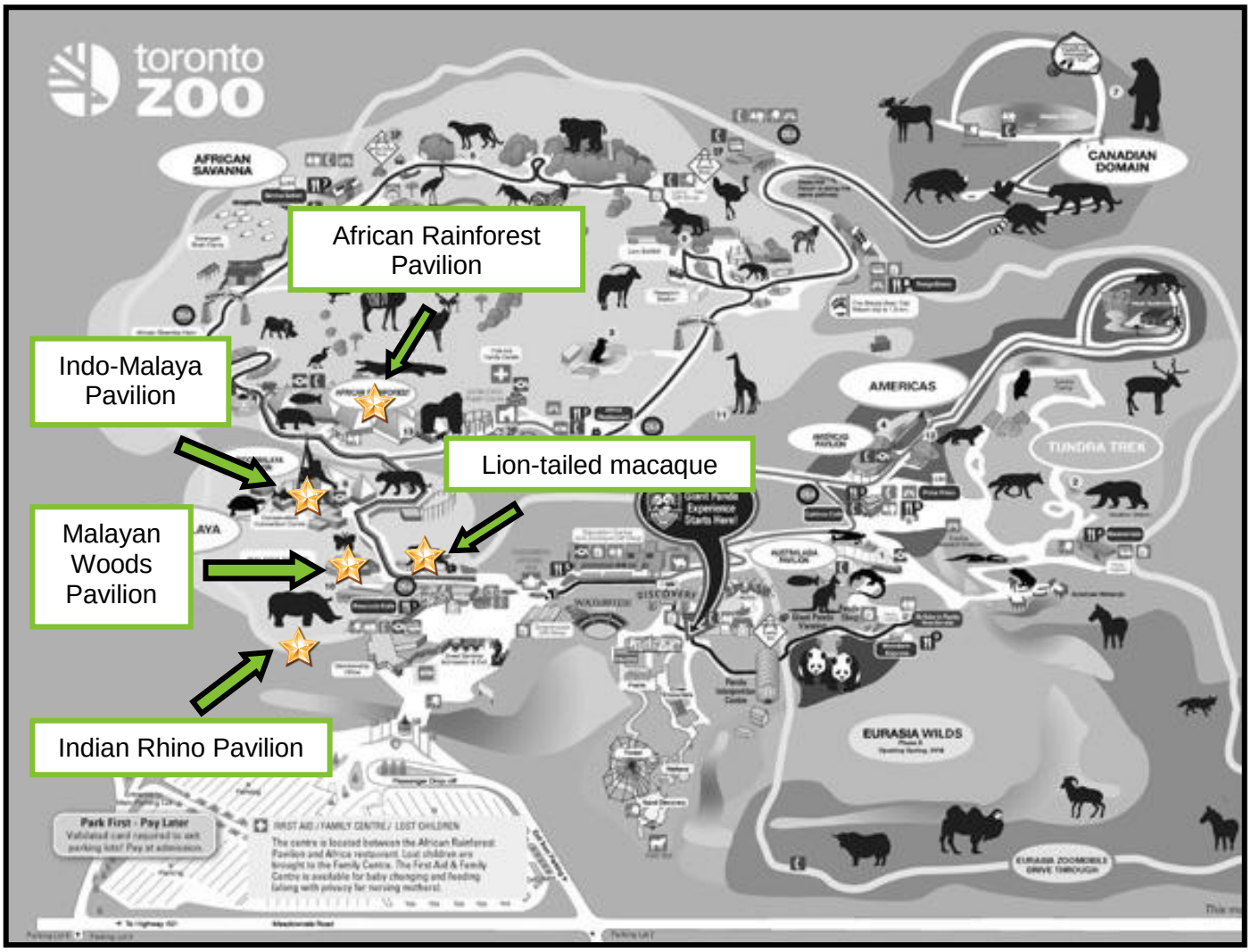
TORONTO ZOO MAP



Grade 3 Curriculum Expectations:

1. Assess ways in which plants have an impact on society and the environment, and ways in which human activity has an impact on plants and plant habitats
2. Investigate similarities and differences in the characteristics of various plants, and ways in which the characteristics of plants relate to the environment in which they grow
3. Demonstrate an understanding that plants grow and change and have distinct characteristics

Introduction:

Review people depending on plants

- Why do we need plants?
  - Plants produce food for energy, shelter, medicine, clothing, and oxygen for breathing
- Have you eaten a plant today? What did you have for breakfast?
  - Toast, juice, jam, fruit, and cereal are all made from plants
- How do people use plants? Think about a farmer
  - Help keep the soil in place, preventing erosion
  - They are used for food (e.g. orchards (apple), crops, etc.) both for people and for animals (e.g. cows)
  - Used to make material for clothing (cotton fields)
- Why do we need to eat plants?
  - Plants convert energy from the sun

Review animals depending on plants

- How do animals use plants?
  - Similar to how people depend on plants
  - Food for energy
  - Shelter (e.g. nests)
  - Medicine
  - Oxygen for breathing

Review plants depending on animals and people

- Do plants depend on people? Yes!
- How?
  - Animals disperse pollen and seeds to new areas (think of burrs clinging to people or animals passing by or squirrels hiding seeds)
  - Animals produce waste that fertilizes the soil
  - People and animals breathe out carbon dioxide, which plants use to make energy
  - Respect and protection

Review plants and their major parts

- What are the basic needs of plants?
  - Air (carbon dioxide), water, light, and space
- What are the major parts of a plant?
  - Root
  - Stem
  - Leaf
  - Flower
  - Seed
  - Pollen
  - Fruit

SELF-GUIDED TOUR

INDO-MALAYA OUTDOOR EXHIBITS

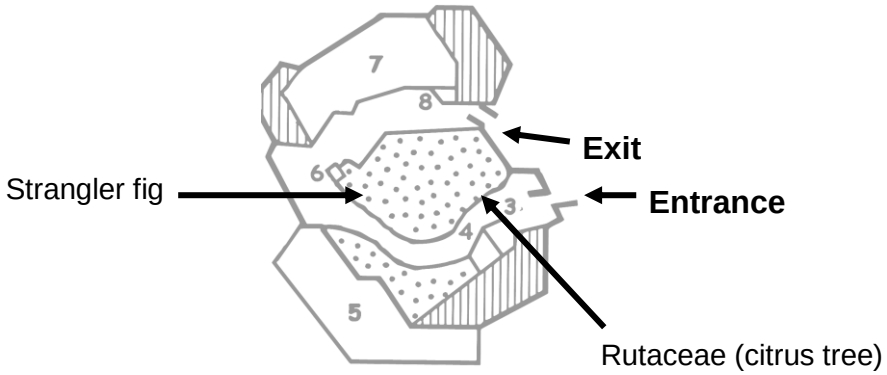
Lion-tailed Macaque

- ***Where do lion-tailed macaques live in the wild?***
  - Macaques live in temperate forests in India
  - They are *arboreal* animals, meaning that they live in trees
  - They spend most of their time in the upper *canopy* of the forests, which is one of the highest levels of the forest (where the tree tops meet)
  - Staying high up in trees provides protection from predators
- ***What do macaques eat?***
  - Macaques are *omnivores,* meaning they eat both plants and animals
  - They eat vegetation (leaves), buds, fruit, insects, small animals and birds
  - Macaques have a special adaptation that allows them to minimize the time they spend in lower areas of the forest where they are more vulnerable to danger
    - Macaques have large pouches inside their cheeks; when they must leave safety to collect food, they simply stuff their cheeks full of what they find, and then return to the treetops to eat in safety
  - When macaques need a drink of water, they simply lick the droplets of moisture that collect on the leaves in the canopy
- ***How do macaques help plants survive?***
  - When macaques eat fruit, they digest the fruit, while the seeds inside pass through their body undigested
  - When the macaque defecates, the seeds are deposited in new areas where they can grow

Indian Rhinoceros

- Look at the mouth of the rhino. ***What type of food do you think the rhino eats?***
    - Leaves and tall grasses that grow along river edges
    - When the rhino eats the grasses, the seeds pass through the digestive system undigested and grow in the rhino's dung/manure piles ("middens")

MALAYAN WOODS PAVILION



Rutaceae (citrus tree)

**on right side, near entrance – look for sign at base*

- This tree belongs to the citrus fruit producing family of trees.
    - Similar trees grow oranges, limes, lemons, and grapefruit.
- ***Have you ever tasted the skin of a citrus fruit? Why do you think it tastes the way it does?***
    - The plant protects the seeds inside the fruit by growing a sour tasting skin around it
- Caterpillars eat the leaves of this tree
    - The caterpillar's green colour helps it camouflage with the leaves, protecting it from predators
- ***How do people use the rutaceae tree?***
    - Eat the fruit they produce, and some species are used for perfumes and medicines

Strangler Fig

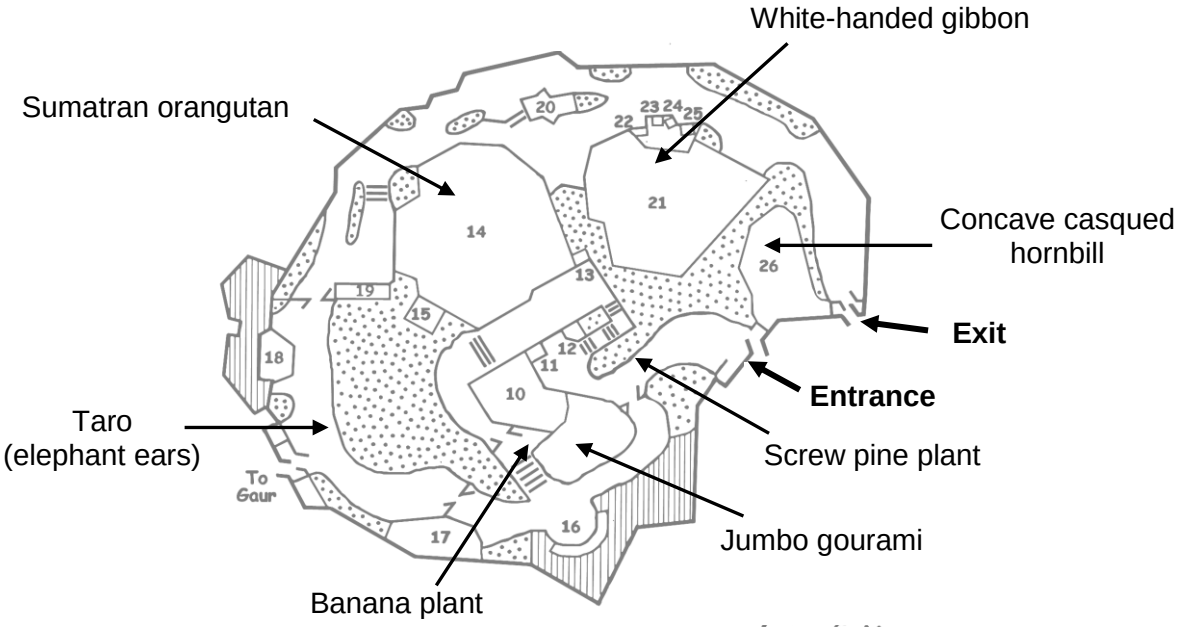
**on left side – look for sign that looks like a book*

- Strangler figs, like other competitors in the rainforest, need to reach sunlight (at the top of the canopy) to survive
- ***How do strangler figs depend on birds and other animals to survive?***
    - Birds disperse seeds from the strangler fig onto tree branches around the rainforest
    - These seeds are able to start growing right from the tree branch (don't require soil), allowing them to grow upward, above the canopy, to reach sunlight
- Strangler figs don't have a strong, sturdy stem/trunk. ***How is it able to grow so tall?***
    - They wrap around the host tree for support, sometimes even killing it by drowning out all of the sun rays
- Competition is fierce for sunlight in the forest
    - While the strangler fig climbs above the trees it grows on, the plants below it grow very large leaves to try to catch as much light as possible

Butterflies (around pavilion)

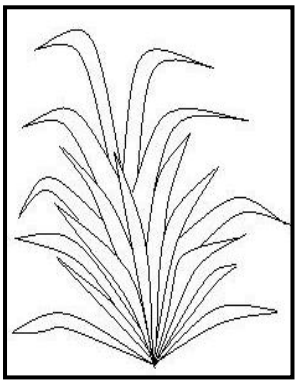
- Butterflies and plants have a special relationship
    - Butterflies need plants for food and use their long proboscises ("tongue") to drink nectar
    - Since caterpillars eat only certain types of plants, butterflies may selectively lay their eggs only on plants that the young caterpillar will eat
    - In order for plants to reproduce, they depend on insects and animals, including butterflies
        - Butterflies carry pollen from one plant to another
- Sometimes specific plants and specific animals rely on each other
    - The bright yellow and black swallowtail butterfly is the only butterfly with a long enough proboscis to reach the nectar of the java glory bower's flower
    - This plant has bright red flowers which easily attract swallowtails
    - Can you think of a butterfly in Ontario that relies on a specific plant?
        - Monarch butterflies and milkweed

INDO-MALAYA PAVILION



Screw Pine

**inside, straight ahead from entrance*



- ***Who remembers how the citrus plant in the Malayan Woods Pavilion defends itself from predators?***
  - The skin of the fruit tastes bad
  - This plant uses a different method. What do you think it is? The screw pine's "saw teeth" protect it. These teeth are very sharp and could easily cut an animal that ventures too close.
- Look closely at the screw pine. ***How do you think it protects itself?***
  - It has "saw teeth" on the edge of its leaves that are very sharp and can easily cut an animal that touches it
- ***Can you eat sand?*** No!
  - But the screw pine can!
  - The roots take up silica (sand) from the soil and use it to build tissue

Climbing Vines (throughout pavilion)

- As you walk through the pavilion, look for trees that have climbing vines growing on them
  - These vines climb on other plants and trees to reach for sunlight at the top of the canopy
  - Unlike trees, they do not need a strong stem, as they rely on other plants to support them
- ***Do the climbing vines have roots?***
  - Some roots hold on to surfaces like rocks and trees, while others reach to the ground to obtain water and minerals from the soil

Jumbo Gourami

**waterfall pond*

- ***What relationship do you think the jumbo gourami has with plants?***
  - The gourami is an *omnivore*, eating both plant and animal matter
  - They eat vegetation that falls into the water and weeds that grow in the water.
  - While they get their food from plants, they help plants by dispersing seeds

Banana Plant

**near the stairs leading down from the orangutan viewing area/after freshwater fish tank*

- Look up to the roof to spot the large leaves of this tree. ***Do you see any bananas?***
- ***Why are the leaves of this plant so large?***
  - The leaves are large to help the plant absorb lots of sunlight
- ***How might the banana plant benefit people?***
  - We eat bananas
  - Some cultures use the leaves for many things: to wrap food, make umbrellas, plates, and even building materials

Taro (elephant ears)

**inside, opposite doors to Gaur exhibit*

- ***What characteristic of this plant allows it to get the most sunlight?***
  - The taro's leaves are *huge*! This allows the plant to gather light that filters through the canopy
- ***The leaves are turned slightly down. Why might this be?***
  - Leaves pointing down allow the plant to drip off excess water in heavy rains
- ***Why is it important for the plant to get rid of water covering it?***
  - The plant would "drown" because the *stomata* (holes for carbon dioxide absorption) would be blocked and the plant wouldn't be able to create the energy it needs to survive
- People living in the forest depend on this plant for food. ***What part of the plant might they eat?***
  - The roots

Sumatran Orangutan

- Orangutans are perfectly suited for life in trees and depend on forest plants for both food and shelter
    - The orangutan has long fingers and toes, perfect for holding branches
    - Their hands also have a hook shape to them, and their thumbs are opposable, moving somewhat like our own
    - These characteristics make tree living easier. As they spend the majority of their time in trees, they can easily hang from a branch using only one leg or arm at a time!
- Orangutans are omnivores, meaning that they eat both plants and animals
    - Prefer fruit and disperse the seeds within the fruit through their feces, which allows new plants to grow in new areas
    - Unlike our lips, an orangutan's lips are almost like a third hand; they are long and can be used to grasp fruit while hanging from trees
- Orangutans sleep in nests made from leaves and branches collected from forest plants

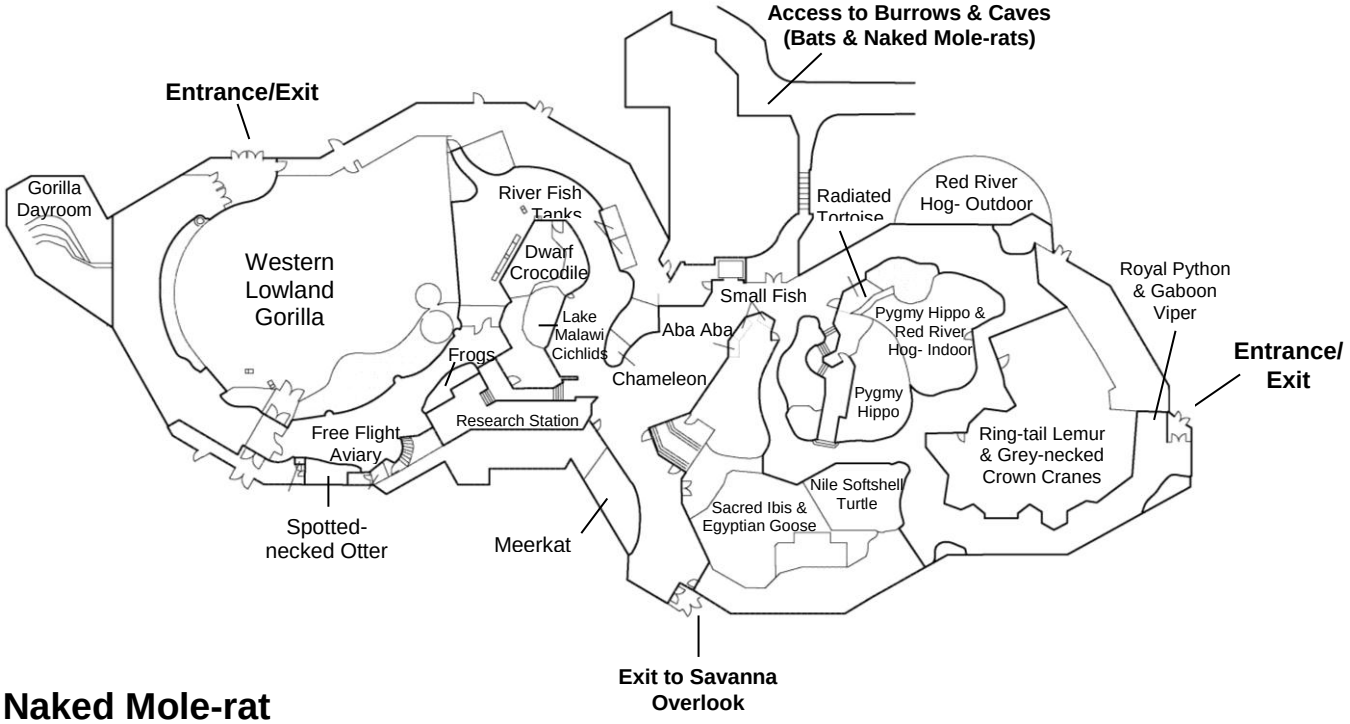
White-handed Gibbon

- Like the orangutans, the gibbons depend on trees to live in and for food such as fruit, leaves, and nuts
- Gibbons have many of the same features as orangutans, which make them good tree-dwellers
    - Like orangutans, they have long fingers, hands, and feet that grip well, longer arms than legs, and eyes of the front of their heads to judge distance
    - The type of movement gibbons use when swinging between tree branches is called *brachiation*.
        - This is when they hang from branches, pull their feet toward their body, and use alternating arms to swing from place to place.

Concave-casqued Hornbill

- The hornbill eats primarily fruit, which makes them very important seed dispersers and contribute to the survival of the forest
- While the forest relies on hornbills, hornbills also depend on forests as they nest in tree cavities high above the ground
    - Female hornbills seal their eggs in using a cover of mud and other materials, so that predators like monkeys and snakes will not be able to get to them

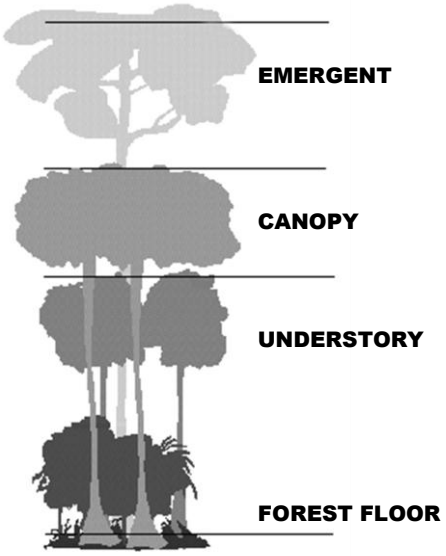
AFRICAN RAINFOREST PAVILION



Naked Mole-rat

- Naked mole-rats spend their entire lives living in a complex system of underground burrows. ***How do they rely on plants for their survival?***
  - Naked mole-rats eat the roots of plants
  - If the mole-rats eat too much of the root, they will kill the plant, so they are very careful in leaving enough of the root for the plant to survive
  - Naked mole-rats also depend on plants for water and obtain all of the water they require from the roots they eat

Gorilla Rainforest Exhibit



- Rainforests are defined by the very high levels of rainfall they receive annually and are home more than 50% of the world's land plants and animals
  - Scientists believe that there could be millions of plant and animal species living in the rainforest that haven't been discovered yet
- Rainforests are separated into four main sections:
  - ***Emergent layer:*** made up of the very tallest trees that rise above most others
  - ***Canopy:*** where most of the treetops meet and is like the roof of the forest; this section provides homes for many different species of animals
  - ***Understory:*** located under the canopy but above the forest floor; snakes, lizards, and forest cats live in this section; ***if very little sun reaches the plants that grow in the understory, how do the plants survive?***

        - Plants grow very large leaves in order to maximize the amount of sunlight they collect
    - ***Forest floor:*** very little sunlight reaches the forest floor, so there is very little plant growth; many insects and larger rainforest animals live on the forest floor
- In addition to supporting a large variety of life, rainforests serve many other functions that are vital to all living creatures. ***What do you think these functions are?***
    - Rainforests help to regulate weather
    - Take in carbon dioxide and produce oxygen through photosynthesis
    - The roots of trees retain water and help prevent the erosion of soil
- ***What section of the rainforest do gorillas live in?***
    - Gorillas are ground-dwelling apes, spending the majority of their time on the forest floor
- ***What do gorillas eat?***
    - Gorillas are primarily herbivorous, eating stems, leaves, vines, bark, fruits, and other vegetation
    - Most of their food is high in water content, so gorillas rarely need to drink water
- ***How else do gorillas depend on rainforests for survival?***
    - Use plant materials to build nests (nightly) either on the ground or low in trees

Rainforest Destruction Display (next to Spot-necked Otters)

Take a look at the side-by-side dioramas showing the impacts of logging on the rainforest.

- ***How do people benefit from rainforests?***
    - Food
    - Timber used for building supplies
    - Minerals and ores obtained through mining
    - Medicines
    - Tourists and the money they bring while visiting rainforests support the local communities
- ***How are humans harming rainforests?***
    - Logging, clearing of trees for farming, mining, and deforestation for expansion of cities threaten the survival of gorillas and other plants and animals that live in rainforests as their habitats are destroyed
    - Without trees, the soil will erode away

Lake Malawi Cichlids (Darwin's Dream Pond)

- ***How do fish, like cichlids, rely of plants for their survival?***
    - Some species of cichlids are herbivores are feed on algae and plants
    - Through photosynthesis, aquatic plants produce oxygen, which dissolves in the water; fish need this oxygenated water to survive
    - Protection from predators
    - Filter the water and keep it clean

Conclusion

Possible discussion questions:

- All plants need sunlight to survive. How do the plants we saw today get enough sunlight? (larger leaves, climb other trees)
- Why do animals need plants? (food, water, shelter, oxygen)
- How do some of the plants we saw today protect themselves from animals? (spines, bad taste)
- What is one way that plants with large leaves protect themselves from heavy rain? (leaves point downward, waxy coating)
- Why does the world need rainforests? (regulate weather, provide oxygen, prevent soil erosion, and are home to many species of plants and animals)
- What products do we obtain from rainforests? (food, medicine, timber, animal meat, tourism)
- How do fish rely on plants for their survival?