TOTTALLY TROPICAL RAINFOREST
OUTREACH GUIDE

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CardinalHealth
Pre-Visit Checklist

☐ Review the Background Information with your students before the Zoo’s visit.

☐ Review the enclosed Lesson Plans which compliment the information presented during the Outreach program. The Zoo’s website, www.columbuszoo.org/animaltracks provides additional Lesson Plans.

☐ Allow at least 30 minutes for set-up prior to program start time and at least 20 minutes for tear-down upon its completion.

☐ Have students begin to enter the assembly 10-15 minutes prior to program start time.

☐ go over the following Zoo rules with students and explain why these rules must exist.
  ☐ Discuss appropriate behavior around the animals and other audience members before, during, and after the program.
  ☐ Remind students to wash their hands thoroughly after touching any animal.
Rainforests are found on every continent in the world except for Antarctica, but only a few qualify as Tropical Rainforests, one of Earth’s most beautiful, beneficial, and eco-rich habitats. So what makes a Tropical Rainforest so special?

Tropical Rainforests are located in a narrow geographical band around the Earth, between the Tropic of Cancer and the Tropic of Capricorn. Due to its position on the equator, this region gets consistent warm temperatures, 12 hours of light a day, and plenty of rain all year long – the perfect recipe for a growing forest and its inhabitants.

Because it is such a perfect place to live, Tropical Rainforests are home to an amazing array of plant and animal species. In fact, despite making up only 2% of the Earth’s surface, Tropical Rainforests contain over 50% of life on the planet. That is a stunning level of biodiversity, or the number and types of organisms found in an eco-system or environmental region, making the Tropical Rainforests an invaluable treasure in preserving the life and health of the planet.

A close-up look at the rainforests of the tropics reveals a different world at every height, from the tallest tree down to the insects on the ground. Rainforests are generally divided into four layers: Forest Floor, Understory, Canopy, and Emergent levels. Each receives differing amounts of sunlight and moisture, and therefore supports different animal and plant life.

The Forest Floor is a dark place, even in daylight, because of the vast amount of trees and plants towering over it. Because it does not receive much sunlight, the Floor is not a tangled mess of plant life, but relatively clear. Here is where some of the most important work of the rainforest is found: the decomposition, or breakdown, of the fallen vegetation. Insects help to eat the fallen leaf litter, thus keeping the decaying matter from choking out new plant growth. This crucial work keeps the rainforest alive and thriving at all levels.

The Understory is the space above the Floor and below the Canopy, and differs greatly from rainforest to rainforest. The Understory is generally quite dark, very warm, and very humid. This, again, is due to its position underneath the thick higher layers of rainforest, such that sunlight and direct wind and rain are blocked from the Understory. Though frequently seen in movies as a thick, leafy, vine-filled jungle of adventure, there are also patches of open space with little vegetation through which one can maneuver easily.

Most of the Rainforest animals make their home in or travel through this part of the Rainforest. Amphibians enjoy the humidity, since their skin needs moisture to stay alive. Insects and Reptiles use their camouflage to enjoy the protection of the plant growth. Birds and bats can fly more freely through the open spaces, and therefore animals who hunt them also roam the Understory looking for a meal, such as jaguars and larger birds.

The Canopy is a thick layer of trees towering overhead, anywhere from 100 to 125 feet above the ground. The many leaves on the
trees convert sunlight to energy all day long through the process of photosynthesis, and this makes the Canopy the powerhouse of the Rainforest. Because the branches are located so close together, animals must travel in this level by gliding, hopping, or climbing. Canopy animals are many and varied, and include toucans, monkeys, and macaws.

The Emergent layer consists of the very tallest trees that break through the Canopy layer and grow to height of skyscrapers. These trees have umbrella-shaped treetops, and must endure the harshest sunlight and wind. Many birds and other Canopy animals visit the Emergent level, including the Harpy Eagle, one of the Rainforest’s best hunters.

Keeping Tropical Rainforests in tact and healthy is crucial to healthy life on the Earth in many ways. Because of the sheer number of trees and plants in this area, a large portion of the Earth’s oxygen supply comes from the Tropical Rainforests. These many plants also help to purify our water, prevent soil erosion, and even play a large role in regulating the Earth’s temperatures, climate, and weather.

Tropical Rainforests also produce and protect many renewable resources we use every day such as fruits and nuts, game, timber, and medicinal plants. In fact, many of the cancer-fighting medicines used by doctors are made from plants found only in the Tropical Rainforest. The aluminum used for our soda cans is made from a rock called bauxite that is found underneath the rainforest trees. Even treats such as chocolate and vanilla come from beans that grow in the tropical climate.

With all of these amazing benefits, it is clear that a beautiful, beneficial, ecological treasure must be protected for the well-being of the Earth and its inhabitants. Despite its importance, the Tropical Rainforests face dangerous threats. Deforestation, or mass logging of rainforest trees, is a huge blow to the health of the ecosystem, with a staggering average of 80,000 acres of rainforest being cut down daily. Unsustainable ranching, farming, and mining and the highway construction necessary to do these projects further disturb the health of the Rainforests. The result of this intrusion is a devastating effect on soil and water health, oxygen production, climate, and wildlife preservation for the entire planet.

But there is hope! As more and more people embrace the idea of preserving the health and beauty of the natural world, “green” awareness is higher than ever. Simple choices we make every day have a direct positive effect on Rainforest preservation. Recycling is a wonderful, easy way to re-use resources we already have rather than gathering more from the source. Researching companies who sell timber products from sustainable forests, or forests where each tree used is replaced by planting more for the future, and supporting such companies goes a long way toward a green future for the Earth. And most importantly, getting educated and educating others about the importance of our Rainforest treasures is the best and most fun way to help the Tropical Rainforests, and the amazing animals who live there.
Vocabulary

**Bauxite:** A soft, whitish-red rock used to make aluminum.

**Biodiversity:** The number and types of animals and plants found in an area.

**Canopy:** The second tallest layer of the Rainforest, made up of a thick ceiling of tall trees.

**Climate:** The average weather conditions of a certain region.

**Deforestation:** Cutting down all or most of the trees in a forest.

**Ecosystem:** A collection of living things and the area in which they live.

**Emergent:** The tallest layer of the Rainforest, with treetops that break through the Canopy ceiling.

**Equator:** The imaginary line around the middle of the Earth.

**Forest Floor:** The bottom layer of the Tropical Rainforest.

**Photosynthesis:** The process by which plants use sunlight to change carbon dioxide into oxygen.

**Sustainable:** Able to continue with little damage to the environment.

**Tropic of Cancer:** The northern boundary of the Tropical region.

**Tropic of Capricorn:** The southern boundary of the Tropical region.

**Tropical Rainforests:** Rainforests located in between the Tropic of Cancer and the Tropic of Capricorn.

**Understory:** The dark and humid layer of Rainforest above the Forest Floor.
Ohio Academic standards

The Totally Tropical Rainforest outreach program is designed to assist teachers in fulfilling the following Ohio Science Content Standards:

**Kindergarten Indicator**
Science- Life B5. Investigate observable features of plants and animals that help them live in different kinds of places.

**Grade 1 Indicator**
Science- Life A1. Explore that organisms, including people, have basic needs which include air, water, food, living space and shelter.

Science- Life B3. Explore that humans and other animals have body parts that help to seek, find, and take in food when they are hungry.

Science- Earth D2. Explain that the supply of many resources is limited but the supply can be extended through careful use, decreased use, reusing and/or recycling.

**Grade 2 Indicators**
Science- Life A1. Explain that animals, including people, need air, water, food, living space, and shelter; Plants need air, water, and nutrients, living space and light to survive.

Science- Life B2. Identify that there are many different environments that support different kinds of organisms.

Science- Life B3. Explain why organisms can survive only in environments that meet their needs.

Science- Life B6. Investigate the different structures of plants and animals that help them live in different environments.

**Grade 3 Indicator**
Science- Life B2. Relate animal structures to their specific survival functions.
Grade 4 Indicator
Science- Life A5. Describe how organisms interact with one another in various ways.

Grade 5 Indicators
Science- Life C4. Summarize that organisms can survive only in ecosystems in which their needs can be met.

Science- Earth C5. Explain how the supply of many non-renewable resources is limited and can be extended through reducing, reusing and recycling but cannot be extended indefinitely.

Science- Earth C6. Investigate ways Earth’s renewable resources (e.g., fresh water, air, wildlife and trees) can be maintained.

Grade 6 Indicator
Science- Life C8. Describe how organisms may interact with one another.
This activity was designed to assist teachers in fulfilling the following Ohio Language Arts Content Standards:

**Writing Applications Standard**

**Grade Three Indicator**
C3. Write formal and informal letters that include relevant information and date, proper salutation, body, closing and signature.

**Grade Four Indicator**
C3. Write formal and informal letters that follow letter format, include important information and demonstrate a sense of closure.

**Grade Five Indicator**
C3. Write letters that state the purpose, make requests or give compliments and use a business letter format.

**Grade Six Indicator**
C3. Write letters that state the purpose, make requests or give compliments and use a business letter format.

**Research Standard**

**Grade Three Indicator**
A3. Acquire information from multiple sources and collect data.

**Grade Four Indicators**
A2. Locate sources and collect relevant information from multiple sources.
B3. Identify important information found in the sources and summarize the important findings.

**Grade Five Indicator**
B2. Locate sources and gather relevant information from multiple sources.

**Grade Six Indicator**
B2. Identify appropriate sources, and gather relevant information from multiple sources.

**BACKGROUND**

Several important laws protect parrots and macaws. The Endangered Species Act of 1973 states it is illegal to “kill, hunt, collect, harass, harm, pursue, shoot, trap, wound, or capture” a member of an endangered species. It also protects the habitat where these animals live. There are many government agencies which work to enforce these laws and create a safe habitat for these magnificent animals.

**GOAL**

Students will practice important letter writing skills while learning more about endangered animal protection efforts.

**MATERIALS**

Access to Research Materials
Parrot/Macaw Organizations List
Pencil
Paper

**PROCEDURE DAY ONE**

1. Define endangered/threatened species. Explain to the students they will be studying an endangered/threatened species from the Rainforest - Macaw.

2. Provide students with non-fiction books about macaws as well as access to the internet. Work as a class to identify questions students may have about these animals. Encourage them to look for information about the methods used to protect these animals.

3. Work as a class to develop a list of questions about parrot/macaw conservation.

**PROCEDURE DAY TWO**

1. Review the elements of proper letter composition with the class.
2. Look over the list of parrot/macaw organizations included with this activity. Decide as a class which organization you will write to for more information about macaw protection programs.

3. Ask students to compose their letters in a proper business format.

4. Bundle all of the letters together in one envelope and send them to the appropriate organization.

**REVIEW**
If you receive a response, review the information as a class.

**LIST OF PARROT/MACAW PROTECTION PROGRAMS**
World Parrot Trust: www.parrots.org
Arcas: www.arcasguatemala.com
This activity was designed to assist teachers in fulfilling the following Ohio Science Content Standards:

**Life Science Standard**

**Grade Two Indicator**
A5. Explain that food is a basic need of plants and animals (e.g., plants need sunlight to make food and to grow, animals eat plants and/or other animals for food, food chain) and is important because it is a source of energy (e.g., energy used to play, ride bicycles, read, etc.).

**Grade Three Indicator**
B2. Relate animal structures to their specific survival functions (e.g., obtaining food, escaping or hiding from enemies).

C6. Describe how changes in an organism’s habitat are sometimes beneficial and sometimes harmful.

**Grade Four Indicator**
A5. Describe how organisms interact with one another in various ways (e.g., many plants depend on animals for carrying pollen or dispersing seeds).

**Grade Five Indicator**
B2. Explain how almost all kinds of animals’ food can be traced back to plants.

B3. Trace the organization of simple food chains and food webs (e.g., producers, herbivores, carnivores, omnivores and decomposers).

**Grade Six Indicator**
C8. Describe how organisms may interact with one another.

**BACKGROUND**

All living things need energy to survive and grow. Living things get their energy from the food they eat. A food chain shows how each living thing gets its food. Each link in the chain is food for the next link.

Most animals are part of more than one food chain and eat more than one kind of food in order to meet their food and energy requirements. These interconnected food chains form a food web.

**GOAL**

Students will learn about food chains and food webs while discovering the importance of every species in a habitat.

**MATERIALS**

One inch thick strips of paper (four to five per student)
Markers or colored pencils
Scissors
Tape or Glue Stick

**PROCEDURE - FOOD CHAIN**

1. Define food chain and provide students with a simple example.

2. Explain that all living things need energy. Plants get their energy from sunlight. The sunlight allows them to make food. This process is known as photosynthesis.

3. Ask the students how animals get energy. They get it from the food they eat! Herbivores get their energy from plants. Carnivores get their energy by eating other animals. Omnivores eat both plants and animals.

4. Write the words plant, herbivore, carnivore, and omnivore on the board.
5. Ask the students to name a habitat. If you are learning about wildlife in your state, you may want to select a habitat in your own backyard! Ask the students to think of plants and animals from this habitat. Write each species in the appropriate column.

6. Have the students look at the plants on the list and think about their adaptations. Do the plants benefit from being eaten? For example, do the plants depend on animals distributing their seeds?

7. Ask them to look at the animals on the list. How do the animals get their food? Do some animals have the same adaptations? For example, do the carnivores all have sharp teeth?

8. Provide each student with four to five strips of paper.

9. Tell them to draw a sun on a strip of paper. This will be the first link in the chain. Have them make a loop with the strip by taping or gluing the ends together. Make sure the picture is on the outside of the loop.

10. Next, tell them to select a species on the board for the second link (a plant). Make a loop connecting it to the first link in the chain. Continue using the animals listed on the board to make loops until the students get to the top predator in their food chain.

**PROCEDURE - FOOD WEB**

1. Define food web.

2. Connect together food chains from the food chain activity. Look for chains that have the same item in them and connect them at that point. For example, if two chains have the same plant, tape them together at the plant link – this will form a food web.

**REVIEW**

Food chains and food webs illustrate the importance of every species in a habitat. Ask the students to consider what would happen if you removed a species from one of the food chains. Discuss as a class how this would affect all of the other plants and animals in the habitat. Remind students how important it is to protect all species, and review ways that they can help protect the environment.
This activity was designed to assist teachers in fulfilling the following Ohio Language Arts Content Standards:

**Writing Process Standard**

**Grade Three Indicator**
I16. Rewrite and illustrate writing samples for display and sharing with others.

**Grade Four Indicator**
I16. Prepare for publication writing that follows a format appropriate to the purpose, using techniques such as electronic resources and graphics to enhance the final product.

**Grade Five and Six Indicator**
I17. Prepare for publication writing that follows a format appropriate to the purpose, using such techniques as electronic resources, principles of design and graphics to enhance the final product.

**Writing Applications Standard**

**Grade Three Indicator**
A1. Write stories that sequence events and include descriptive details and vivid language to develop characters, setting and plot.

**Grade Four Indicator**
A1. Write narratives that sequence events, including descriptive details and vivid language to develop plot, characters and setting and to establish a point of view.

**Grade Five Indicator**
A1. Write narratives with a consistent point of view, using sensory details dialogue to develop characters and setting.

**Grade Six Indicator**
A1. Write narratives that maintain a clear focus and point of view and use sensory details and dialogue to develop plot, characters, and a specific setting.

**BACKGROUND**

Plants and animals depend on each other for their survival. It is important species stay in balance so they have all of the resources they need in their habitat.

**GOAL**

Students will learn about how plants and animals depend on each other while practicing important language arts skills.

**MATERIALS**

- The Great Kapok Tree: A Tale of the Amazon Rainforest by Lynne Cherry
- Paper
- Pencil

**PROCEDURE**

1. Read the book The Great Kapok Tree: A Tale of the Amazon Rainforest by Lynne Cherry

2. Talk about the animal habitats in your region. What kinds of plants might act like a kapok tree in your state? What animals would live in that plant?

3. Ask the class to select a plant that will be your kapok tree.

4. Make a list of the animals that will live in this plant.

5. Attach a verb to each animal on your list (for example: insects burrow or squirrels climb).

6. Review with your students the important aspects to consider when writing a narrative piece.

7. Ask the students to write their own “kapok tree book” about the plants and animals your class has selected. They can refer to the class list of animals if they need help. Make sure there are copies of the Great Kapok Tree available for your students to use as a reference.
8. When their work is completed, allow the students to get feedback from their classmates. Provide an opportunity for students to revise their work.

9. Encourage your students to illustrate their book.

10. Share the completed books with younger students at your school.

**REVIEW**
Discuss the relationship between plants and animals in a habitat. Ask your students to consider what would happen if the plant from their book was no longer in the habitat. How would it affect the animals who depend on it?
This activity was designed to assist teachers in fulfilling the following Ohio Science Content Standards:

**Life Sciences Standard**

**Grade One Indicators**
A1. Explore that organisms, including people, have basic needs which include air, water, food, living space and shelter.

A4. Investigate that animals eat plants and/or other animals for food and may also use plants or other animals for shelter and nesting.

**Grade Two Indicators**
A1. Explain that animals, including people, need air, water, food, living space and shelter; plants need air, water, nutrients (e.g., minerals), living space and light to survive.

B3. Explain why organisms can survive only in environments that meet their needs

A5. Explain that food is a basic need of plants and animals and it is an important source of energy.

**BACKGROUND**

Rainforest animals are threatened by the loss of habitat. When trees of the rainforest disappear, the animals which live there lose not only their sources of food, but their homes as well.

**GOAL**

Students will create a simple home for an animal from the rainforest and describe how their home meets the needs of this animal.

**MATERIALS**

 Variety of collage materials, markers or crayons, scissors, glue, heavy paper

**PROCEDURE**

1. Introduce students to the components which create a suitable habitat for an organism. Ask students what they need in their habitat. Explain that all animals need food, water, shelter, and space to survive.

2. Ask students to use the art materials supplied to create a habitat for an animal from the rainforest. This activity can be done by individual students or as a group project.

3. Allow students to describe what they created. Ask them how their habitat provides their animal with the things they need to survive (food, water, shelter, space).

**REVIEW**

Discuss how important it is for every species to have the things it needs to survive. Think of ways you can help local species. For example, encourage students to reduce, reuse, and recycle to help protect the habitats of wildlife.