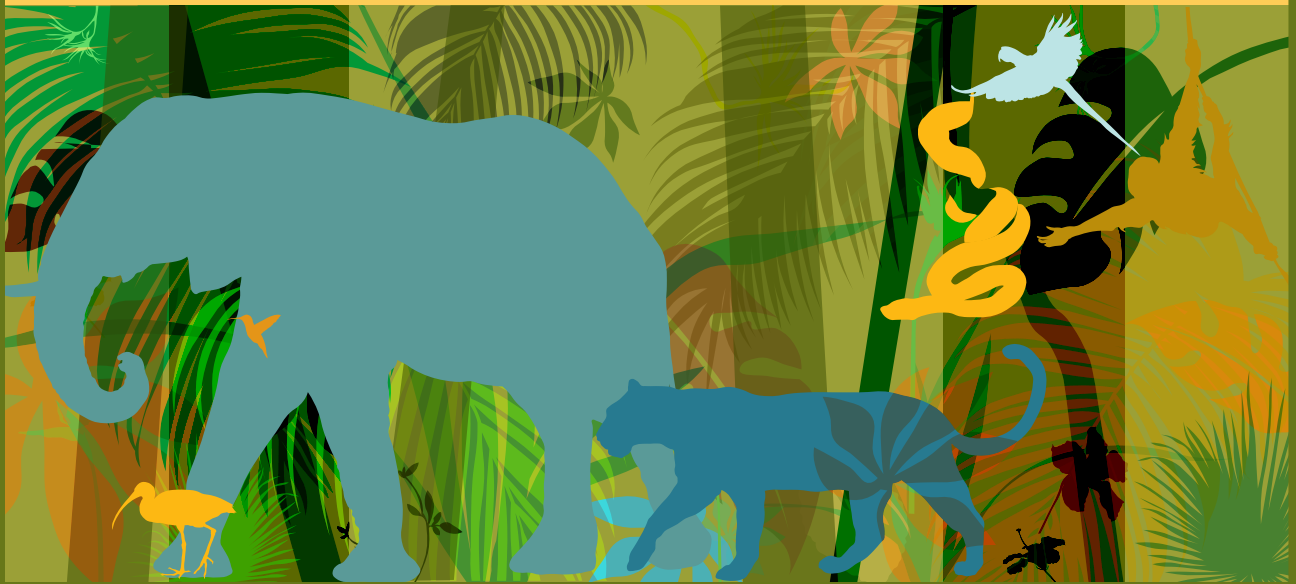




Wildlife RESCUE

A special exhibit



Education Guide

Lesson Plans and Worksheets

K to Grade 4



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Introduction

Wildlife Rescue will immerse you in compelling stories of animal rescue from around the world. Explore the efforts of everyday people who dedicate their lives to helping animals survive. Fly in an ultralight plane to lead whooping cranes to their wintering grounds. Discover how waterfowl are being saved from oil spills and how orphaned elephant calves and baby orangutans are being raised and released back into the wild. Join the rescue efforts and experience the innovative science supporting these achievements.



Build a Bird Feeder

Duration: 30 minutes

Lesson Plans: K to Grade 4

Activity Description:

Birds can have a hard time finding food if their food source is diminished, such as in the winter. A backyard bird feeder is a great way to provide native birds with nutritious food, and to watch them at the same time! In this activity, students will build a bird feeder with nutritious food for wild birds.

Exhibit Description:

This activity relates to the “What Will I Do?” and “What Can I Do?” exhibits in Zone 5, the Home Front area. Visitors are encouraged to consider how their everyday actions can make a difference in helping to restore species and maintain biodiversity. They are also given an opportunity to consider what actions they plan to take to improve their own ‘backyard’, and register their ‘vote’ by pressing a button.

For an overview of the *Wildlife Rescue* exhibit and a description of the Home Front Zone, please refer to the “*Wildlife Rescue* Exhibit Description” document.

Background Information:

Migrating birds fly great distances in the spring to their breeding grounds and again in the fall to their wintering habitats. During the winter, some birds stay in a cold habitat that does not provide a lot of food. These birds require additional food which they can cache (store) or turn into fat deposits.

Often, human developments such as roads, industry and urban areas destroy animal habitats and natural food sources. One way we can help birds cope is to provide them with a constant source of nutritious food, so it is important to remember to restock the feeder. Once the birds discover the new food source they will begin to depend on it. If you have to go away for any period of time, there are a few things that can be done. First, if it is a short trip you can stock the feeder so it doesn’t go empty while you are gone. Second, you can ask a neighbor to monitor the food level and fill it up while you are gone.

As for what to put in the bird feeder, it depends on what birds you are trying to help. Some birds prefer certain seeds, while others may prefer fruits and berries or fatty animal products such as suet. When in doubt, black-oil sunflower seeds attract the greatest number of species.

Materials:

(warm weather)

- Empty milk or juice cartons
- Straws, shish-kebob sticks or skewers
- Bird seed (available from a local bulk food store or pet store)
- String
- Scissors
- Paints or markers

Procedure:

(warm weather)

In this activity, students will use seeds to attract local birds. Seed feeders attract a wide variety of birds and are also the most economical type of feeder to make. Seeds also keep well in hot or cold weather, while other food types can spoil in the heat.

Introduction:

1. Have students research some birds in their local area. Determine what local birds like to eat, to decide what to put in the feeder.

Activities Conducted:

1. Instruct the students to cut a hole in the milk carton. The hole must be big enough for the birds to eat from, and about 1/3 of the way up from the bottom of the carton. Do the same on the opposite side of the carton, so that you have two holes for birds to eat from.
2. Ask the students to put a skewer through the carton just below each hole. The skewer should extend out of the carton at least 3 centimeters (1 in) to create a perch for the birds.
3. In the top of the carton, punch two holes for a string. Run a piece of string through the holes, and tie a knot to create a loop to hang the bird feeder.
4. Ask the students to decorate the feeder with paint or markers.
5. Fill the feeder with the seeds the students have chosen, and hang it in a tree to observe the birds.

Conclusion:

Ask the students the following questions. Answers can be found in the background information.

1. What human activities might make it difficult for birds to find food?
2. Why is it important to provide a constant source of food for birds?
Have students discuss the needs of birds at different times of the year.

Extensions/Adaptations:

- Monitor the bird feeder over the next few days. Record the types and numbers of birds visiting the feeder. Refill the feeder when necessary.
- Have students research one of the birds that visits the feeder. Find out about its habitat requirements, life history, food preferences, whether or not it migrates, and so on.

Materials:*(cold weather)*

- Pine cones
- Lard or vegetable shortening
- Bird seed (available from a local bulk food store or pet store)
- Spoons
- String
- Scissors
- Wax paper

Procedure:*(cold weather)*

In this activity students will use suet feeders to attract birds. Suet is a high source of protein and fat that birds can easily access and store. Suet should only be fed during cold weather, because it will spoil in warm weather. If the weather is warm, try making a seed feeder (*see previous instructions*).

Introduction:

1. Have students research some birds in their local area. Determine what local birds like to eat, to decide what to put in the feeder.

Activities Conducted:

1. Each workstation should be covered with wax paper for easy cleanup.
2. Hand out the materials so that each student (or pair of students) has everything he or she needs to make a suet feeder.
3. Instruct students to wrap string around their pinecones so that they will be able to hang them from a tree when they are finished.
4. With a spoon, spread the lard or shortening over the entire pinecone. Don't forget to tell the students to get it in between the scales of the pinecone!
5. Spread seeds onto the wax paper and roll the pinecone until it is fully covered with seeds.
6. Hang the feeder outside in a tree.

Conclusion:

Ask the students the following questions. Answers can be found in the background information.

1. Why is it important to provide food for birds in cold winter weather?
2. What human activities may limit bird food supplies? How can we help?

Extensions/Adaptations:

- Monitor the bird feeder over the next few days. Record the types and numbers of birds visiting the feeder. Roll the pinecone with more seeds when necessary.
- Have students research one of the birds that visits the feeder. Find out about its habitat requirements, life history, food preferences, whether or not it migrates, and so on.

Nature's Waste

Duration: 1hr + daily observations

Lesson Plans: K to Grade 4

Activity Description:

In this activity, students will discover that nature does not create garbage in the same way people do. In nature, waste is recycled through the ecosystem and used again to foster new life. Students will look at the garbage they make in an average day and where it goes, and compare it to waste in nature and where it goes.

Exhibit Description:

This activity relates to the "Be an American Burying Beetle" exhibit in Zone 2, the Species Recovery area. In this exhibit, visitors take on the role of a burying beetle parent by simulating the burial of a 'dead mouse' to provide a home for their larvae. The exhibit illustrates how these insects are important natural recyclers that return valuable nutrients to the soil by recycling the carcasses of small animals.

For an overview of the *Wildlife Rescue* exhibit and a description of the Species Recovery Zone, please refer to the "*Wildlife Rescue* Exhibit Description" document.

Background Information:

Ecosystems are delicately balanced. They contain living, dead and non-living components, and each piece of the ecosystem is just as important as the next. When a living organism dies, it provides many services to the rest of the ecosystem. A dead organism can provide food for a condor, a nursery for American burying beetles and nutrients for the soil so plants can grow. This cycle between living and dead organisms is one of the things that contributes to a healthy ecosystem.

There are many animals, plants, fungi and bacteria that are responsible for decomposing dead animals and plants. One of these animals is the American burying beetle. This beetle is an unusual insect, since both parents play a role in parenting the offspring. The male beetle finds a carcass and attracts a female. The pair then buries the carcass by moving the soil from underneath it until it is underground. Once the carcass is underground the eggs are laid on the carcass. When the eggs hatch the larvae eat the carcass as they grow.

The burying beetle helps decompose animals so nutrients can be recycled back into the soil. Decomposition happens in all dead animals and plants in a similar way. The science behind decomposition is why people use composting to get rid of organic household waste. When people put organic matter into the composter, bacteria begin to decompose the organic waste. Some composters use worms to help speed up the decomposition process. The worms eat the organic material, digest it and then excrete a waste product. This waste product is nutrient-rich and many people use it as a fertilizer in their gardens.

Nature recycles material. One organism's waste can be used to help another organism grow. In nature, there is no such thing as garbage. In this activity students will investigate composting and recycling as alternatives to throwing out organic waste.

Materials:

- Large container with lid
- Soil
- A dozen worms (red wigglers work best, but any worms from a bait shop will also work)
- Classroom garbage can
- Classroom waste
- Food waste (lunch leftovers work well)

Procedure:**Introduction:**

1. After lunch, have students sort all of the garbage in the classroom. Separate the garbage into three containers: one container for garbage, one for recycling and one for compost.
2. Ask the students if they think nature makes garbage. Explain to them how nature deals with its waste. Introduce the idea of an ecosystem and the organisms that are responsible for decomposing waste.

Activities Conducted:

1. Have the students brainstorm what items from the classroom waste might be able to decompose.
2. Explain to the students the process of decomposition.
3. Inform the students that they will be making a composter.
4. Have the students help fill a large container with soil and a dozen worms.
5. Ask the students to throw any organic waste from today into the composter. Organic waste can consist of fruit, vegetables, leaves, twigs, eggshells and so on. The students can continue to compost organic waste throughout the year and observe the changes over time.

NOTE: refrain from putting meat in the composter. As it begins to break down, it will make the composter smelly.

6. Make sure to put the lid on the composter. The worms will eat all of the organic matter in the compost.
7. Helpful tip: Keeping the composter moist will help decompose organic matter. Having a soaking wet compost will lead to mold and a smelly composter. Monitor the moisture in the composter carefully.

Conclusion:

1. Ask the students if they can think of any animal or plant in nature, other than worms, that helps to decompose some of nature's waste. Do any animals or plants benefit from this waste? Do animals and plants benefit from human garbage?
2. Visit the compost over time to observe the changes in the organic waste. Discuss with the students why certain things may break down faster than others.

Extensions/Adaptations:

1. Ask the students to make composters at home and continue composting outside of the classroom.

Oiled Eggs

Duration: 50 minutes

Lesson Plans: K to Grade 4

Activity Description:

Students will investigate the characteristics of eggs and learn what happens when oil coats a bird and its eggs.

Exhibit Description:

This activity relates to the “Seabird Rescue” exhibits in Zone 4, the Emergency Response area. Visitors use magnifiers to observe the effects of oil on bird feathers, and operate a mechanical device to simulate how a bird fluffs its feathers to keep warm. They also select objects that represent the five main steps involved in cleaning birds covered in oil and watch rescuers rehabilitate oil-covered seabirds.

For an overview of the *Wildlife Rescue* exhibit and a description of the Emergency Response Zone, please refer to the “*Wildlife Rescue* Exhibit Description” document.

Background Information:

Bird feathers are arranged in a particular way to help keep a bird dry and insulated. The shaft of the feather, called the rachis, has a series of barbs along its length. On each barb, tiny barbules hook onto each other to keep the feathers together and form an interlocking waterproof layer. A bird may spend many hours each day preening (smoothing and cleaning) its feathers to ensure they stay properly maintained to keep the bird warm. Any disturbance to the proper functioning of its feathers can expose the bird to extreme cold and lead to hypothermia.

Birds can get covered in oil if their habitat becomes contaminated with oil. Oil can enter water systems in a few ways. There can be accidental collisions, illegal dumping, and most recently, offshore drilling catastrophes. Oil coats a bird’s feathers and disrupts the barbules so the bird can no longer stay warm.

During the nesting season, oil can be distributed to a bird’s eggs if either the bird or the eggs come into contact with the oil. The parents can accidentally coat their eggs with oil from their own feathers and feet. An eggshell is porous and needs to exchange gases with the environment to allow the developing chick inside to breathe. When oil coats an egg, it clogs the pores and makes gas exchange impossible, which prevents the chick from properly developing. In this activity the students will investigate the effects of oil on birds and their eggs.

Materials:

(per group):

- 4 hard-boiled eggs
- 3 bowls
- Water
- Cooking oil
- Paper towels
- Plastic knife
- Oiled Eggs worksheet

Procedure:**Introduction:**

1. Go over the background information with students.
2. Split the class up into groups of 2 to 3 students. Distribute the "Oiled Eggs" worksheet and materials to each group.
3. Instruct the students to follow the steps in the worksheet and investigate how oil affects bird eggs.

Activities Conducted:

1. Ask the students to place one hard-boiled egg in each of the three containers. Leave one egg out, so that it can be compared to the others later.
2. Fill the three containers with oil to cover the eggs.
3. Leave one egg in the oil for 5 minutes, one for 15 minutes, and one for 30 minutes.
4. Take each egg out of the oil, making sure to wipe off the excess oil. Ask the students to investigate the egg and compare each egg to the non-oiled egg.
5. Peel off the eggshells and ask students to investigate the egg whites by cutting them in half using plastic knives.
6. Ask the students if there are any differences between the four eggs. Have the students record these observations on the worksheets.

Conclusion:

1. Have students discuss how the oil transferred through the eggshell and into the egg whites. How might oil affect wild bird eggs?
2. Make sure to clean up the mess. Soak up any excess oil with paper towels and avoid pouring it down the drain.

Extensions/Adaptations:

- For younger grades, read instructions one at a time to students and have them conduct the experiment together. For the older grades, have them read the handout and conduct the experiment in groups.

Save a Species, Create a Habitat

Duration: 30 minutes

Lesson Plans: K to Grade 4

Activity Description:

In this lesson, students will learn what makes a healthy habitat for elephants and orangutans and how those animals are adapted to their habitats. They will use worksheets to create habitats for these two animals and describe why each component of the habitat is needed for these animals to survive.

Exhibit Description:

This activity relates to the theater show in Zone 3 called “Return to the Wild”. Here, visitors take a journey to Borneo and Kenya to learn about efforts to save and rehabilitate orphaned orangutans and African elephants. They are exposed to the very different habitats of orangutans and elephants, and learn about the requirements that each animal needs to survive.

For an overview of the *Wildlife Rescue* exhibit and a description of the “Return to the Wild” Zone, please refer to the “*Wildlife Rescue* Exhibit Description” document.

Background Information:

A habitat is an area where members of certain species of animals and plants live together. It includes everything that those species need to survive. All living things need food, water, shelter and space to survive. Two examples of animals that have different needs and require different habitats are orangutans and elephants. Orangutans live in forests on the island of Borneo while elephants live in savannahs in sub-Saharan Africa.

Orangutans live in the flood-prone forests of Borneo. They are well adapted to this habitat. Orangutans are arboreal, which means they spend a lot of their time in trees. Their bodies are adapted to climbing trees since they have long arms and legs. Orangutans can grasp objects with both their hands and feet, which makes climbing easier. They feed on over 500 species of plants, fruits and flowers in the forest. Plants flower and fruit at different times of the year so orangutans are always on the move in search of food. They prefer flood-prone areas of the forest to drier areas of the forest since wet areas produce more fruit.

On the other hand, elephants are adapted to savannah habitats in sub-Saharan Africa. They are the largest terrestrial mammals, which makes moving around in dense forests difficult. They are better suited to large open habitats than dense bush or forests. Elephants are herbivores and spend most of their day searching for food and water. Elephant diets are varied but can consist of leaves, grasses, bark and fruits and they can travel up to 50 kilometers a day in search of food.

Each species of plant and animal has a specific habitat where it can survive. Elephants are suited to one type of habitat while orangutans are suited to another. Students will determine which habitat belongs to which animal and what the animal needs to survive.

Materials:

- Animal Habitat worksheet
- Scissors
- Glue

Procedure:**Introduction:**

1. Introduce the activity by having students think about what makes a healthy habitat. List these ideas on the board. There are essentially four main healthy habitat components: food, water, shelter and space. Other components of healthy habitats can also be listed, such as warmth, sunshine, fresh air, predators and prey.

Activities Conducted:

1. Hand out one "Animal Habitat" worksheet to each student. The student's task is to place the habitat components with the animal in the habitat squares.
2. Instruct students to cut out these habitat components and paste them onto the appropriate habitat square. Ask the students to color the habitats and each component.

Below is a list of each animal and some of the necessary habitat components for its survival:

Animal	Habitat	Habitat Components
Orangutan	Low lying forests in Borneo	<ul style="list-style-type: none"> - 60% of diet is fruit such as figs and durians - Other food consists of flowers, leaves, bark and insects like termites - Trees to climb and sleep in - Large undisturbed forest habitat
Elephant	Savannah and forest in sub-Saharan Africa	<ul style="list-style-type: none"> - Leaves, fruit and tree bark for food - Trees for shade and to eat - Mud holes to keep cool and drink from - Large habitat to travel through and find food and water

Conclusion:

1. When the students have finished creating the habitats, they can present them to the class and each component they included in their habitats.
2. Ask the students to think about the different ways that the animals are adapted to their habitats. What physical features allow the animals to survive in their habitats?

Extensions/Adaptations:

- Ask older students to write a short description on the back of their habitat worksheet describing how each habitat component helps the animals to survive. They can also talk about how all the other living things in their habitat depend on each other to survive.
- Instead of using the worksheet, older students can try creating a habitat by drawing and labeling each of the habitat components for an animal of their choosing.
- Have students use their imaginations to create a new species of animal. They can do this by mixing and matching animal parts that are cut out of magazine photographs or they can come up with their own animal. Based on their animal, they need to create a habitat that is suitable for it to survive. Ask students to give the animal a name, and then draw a picture of that animal in its habitat showing all of the habitat components necessary for it to survive.

Life-size Whooping Crane Silhouette

Duration: 45 minutes

Lesson Plans: K to Grade 4

Activity Description:

The whooping crane is the tallest bird in North America. Students will compare their own height and size to a whooping crane skeleton.

Exhibit Description:

This activity relates to the “Fly with the Whooping Cranes” exhibit in Zone 2, the Species Recovery area. Visitors embark on a simulated flight in an ultralight aircraft to guide young whooping cranes on their first migration, and learn more about the journey they are taking with the birds. This experience highlights the challenge of releasing captive-bred whooping cranes into the wild, the long journey taken by the aircraft and the birds, and how these kinds of special techniques are helping to restore this endangered animal.

For an overview of the *Wildlife Rescue* exhibit and a description of the Species Recovery Zone, please refer to the “*Wildlife Rescue* Exhibit Description” document.

Background Information:

An adult male whooping crane can reach a height of 1.5 meters (5 ft) and can have a wingspan of nearly 2 meters (6.5 ft). An adult can weigh about 6 kilograms (13 lb). Whooping cranes can be identified by their white feathers, thin black legs, long neck and long pointed bill. They also have bright yellow eyes with black feathers on their crown (the top of their head), on their face, and on the tip of their wings. Another characteristic of whooping cranes is that they fly with their legs trailing straight behind their bodies.

Whooping cranes get their name from their distinctive whooping call. This call can travel over a few kilometers to alert other whooping cranes to the location of their breeding territory. A pair of birds may perform a unison call during spring courtship.

Each fall, the only wild population of whooping cranes migrates from Wood Buffalo National Park on the border of the Northwest Territories and Alberta, Canada. Their final destination is Aransas National Wildlife Refuge, Texas, where they will spend the winter feeding and resting. In the spring, whooping cranes will make the migration back to their breeding grounds in Canada.

Whooping cranes are the most endangered bird species in North America, but people are working together to save this species from extinction. Many groups are breeding these birds in captivity to increase the whooping crane population size and start a new migratory flock. In the wild, young birds are taught to migrate by their parents, so captive-born whooping cranes are taught to migrate by pilots flying ultralight aircraft. This new flock is taught to migrate from their breeding location in Wisconsin to their wintering grounds in Florida.

Materials:

- Sheets of white paper put together to form a larger sheet that is 1.5 meters long by 2 meters wide (5 ft by 6.5 ft)
- Tape measure and ruler
- Pencils
- Crayons or markers
- A wall to hang the silhouette
- Black construction paper
- Life-size Whooping Crane Silhouette worksheets

Procedure:

Introduction:

1. Begin the lesson by giving background information on the whooping crane to the students. Show the students pictures of the birds included with the lesson.

Activities Conducted:

1. Instruct the students to lay the sheet of paper on a flat surface.
2. Using the template provided, create a life-size silhouette of a whooping crane on the sheet that has just been measured. Vertically, the 1.5 meter (5 ft) height of the sheet will be the height of the whooping crane. Horizontally, the 2 meter (6.5ft) width of the sheet will be the wingspan.
3. Hang the life-size whooping crane on a wall with the feet touching the floor.

Conclusion:

1. Ask the students to compare their own height to the height of the whooping crane image.
2. A whooping crane weighs about 6 kilograms (13 lb). Ask the students to compare their weight to that of a whooping crane.

Extensions/Adaptations:

- Research where whooping cranes are found and if there are any in your area.
- Check out Operation Migration on the internet for more cool information about whooping cranes!



Worksheets

K to Grade 4

Oiled Eggs worksheet	17
Save a Species, Create a Habitat worksheets	18
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Life-size Whooping Crane Silhouette worksheets	23



Oiled Eggs

Duration: 50 minutes

Worksheets: K to Grade 4

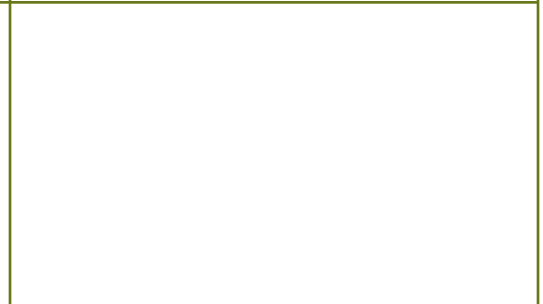
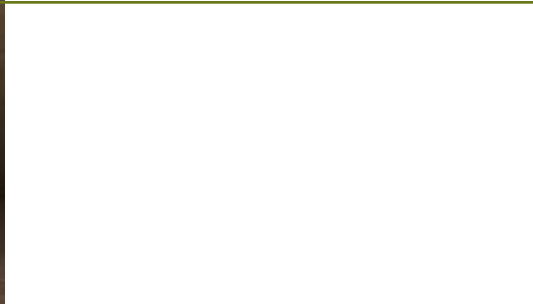
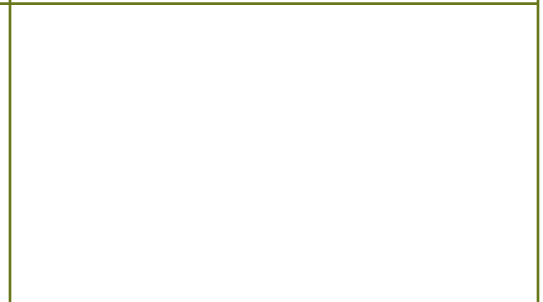
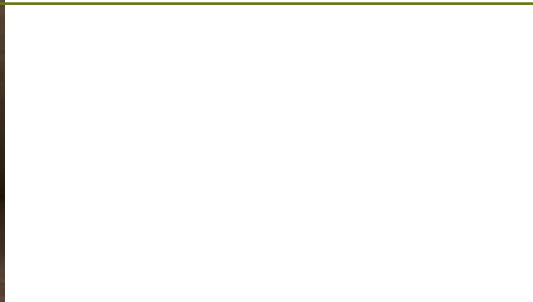
Instructions:

1. Place one hardboiled egg in each container. Keep one egg aside for comparison.
2. Pour enough oil into each container to fully cover each egg.
3. Let one egg sit in the oil for 5 minutes, one for 15 minutes, and one for 30 minutes.
4. Remove each egg after the allotted time and wipe off any excess oil with a paper towel. Does your egg look any different than the egg that did not sit in oil?
5. Remove the eggshell from each egg. Investigate the egg whites by cutting the eggs in half. Are there any differences between the four eggs?

Eggshell

Egg Whites

Original
(Non-oiled)



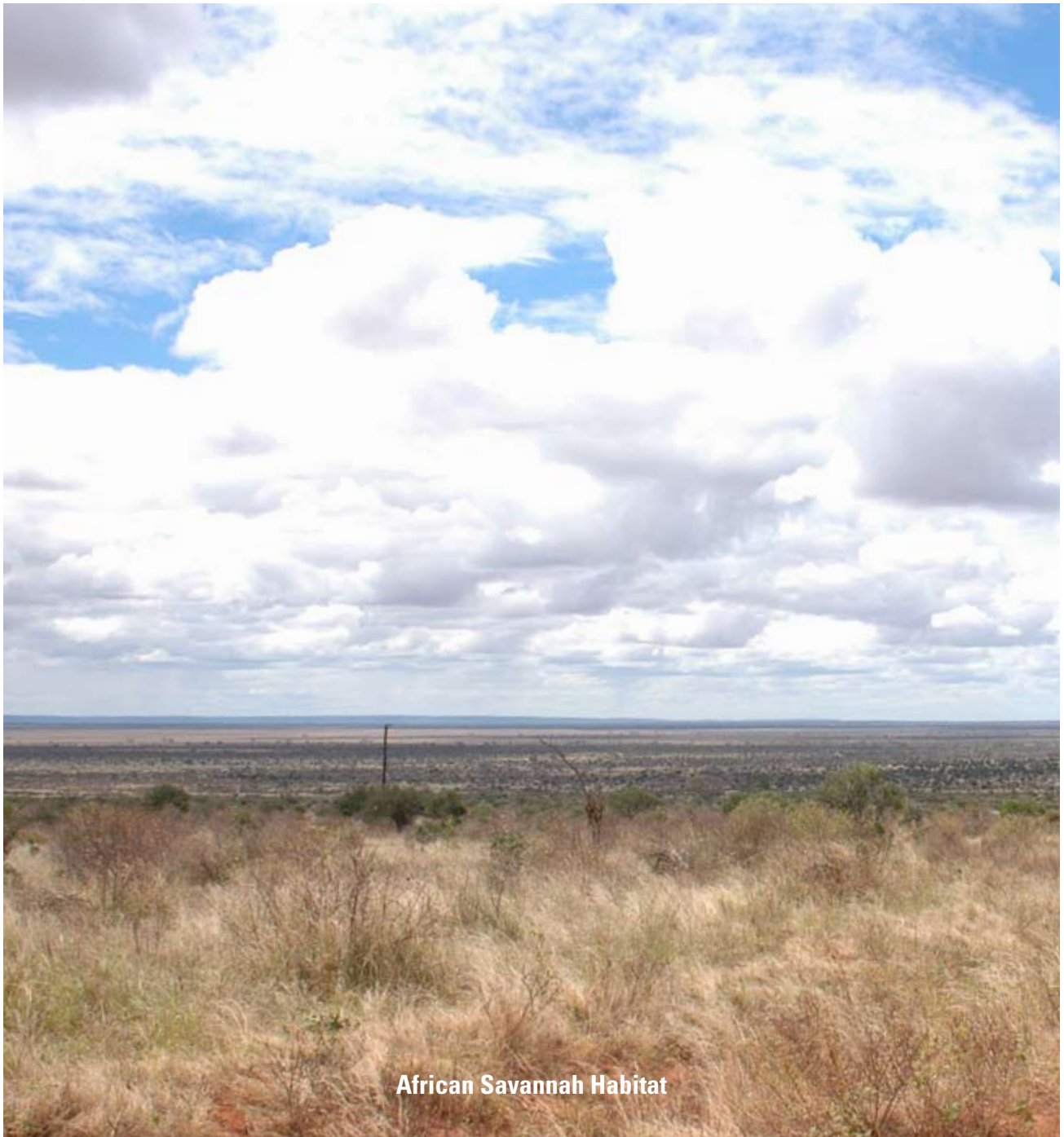
Save a Species, Create a Habitat

Duration: 30 minutes

Worksheets: K to Grade 4

Animal Habitats

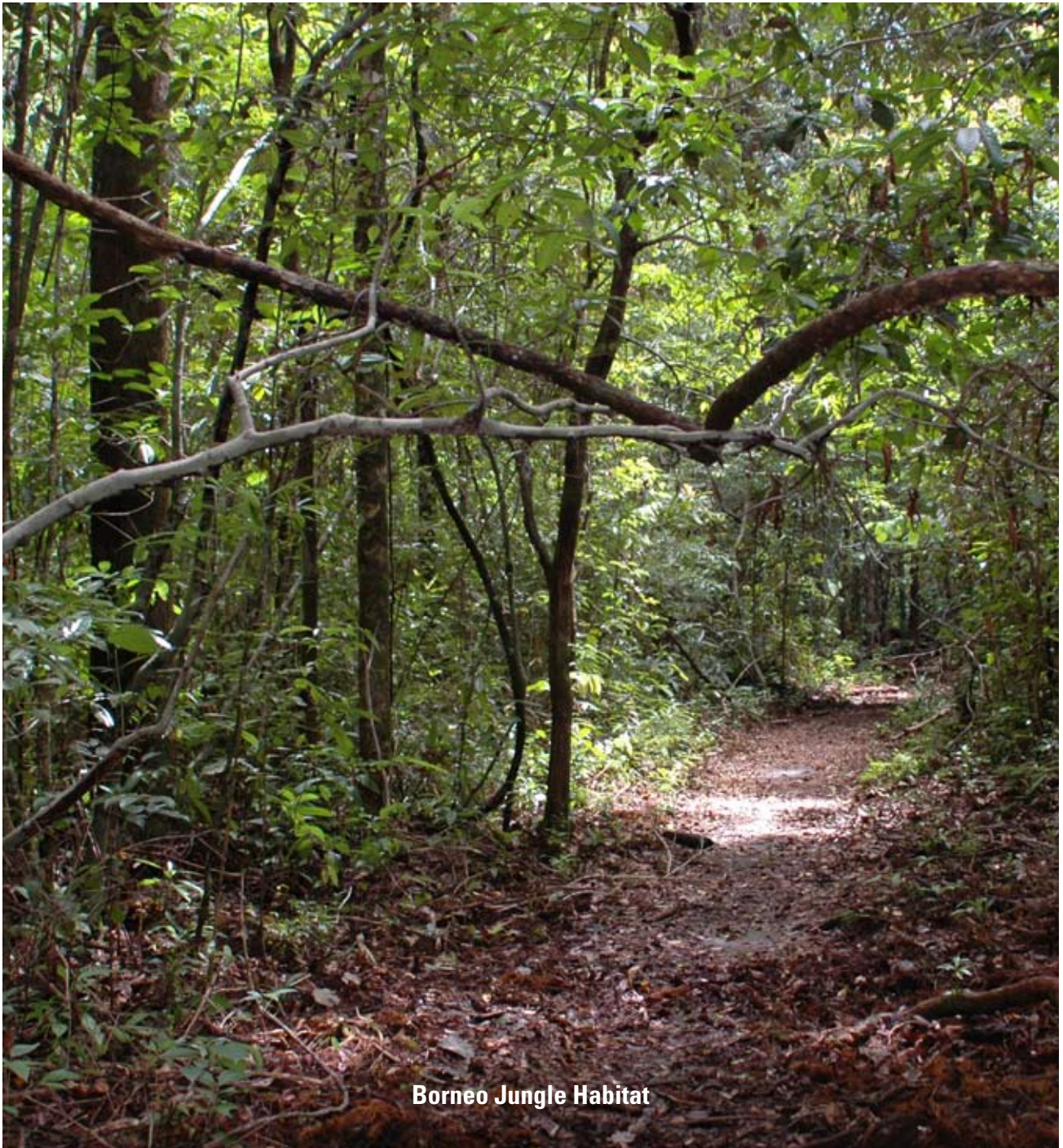
Instructions: Cut out the animal and paste it on the proper habitat. Determine what each animal needs for survival and paste the image representing each of the animal's needs in the correct habitat along with the animal.



African Savannah Habitat

Animal Habitats

Instructions: Cut out the animal and paste it on the proper habitat. Determine what each animal needs for survival and paste the image representing each of the animal's needs in the correct habitat along with the animal.



Borneo Jungle Habitat

Elephants



Grasses



Watermelon



Water hole

Trees



Orangutans



Figs



Lychee fruit



Termite mound

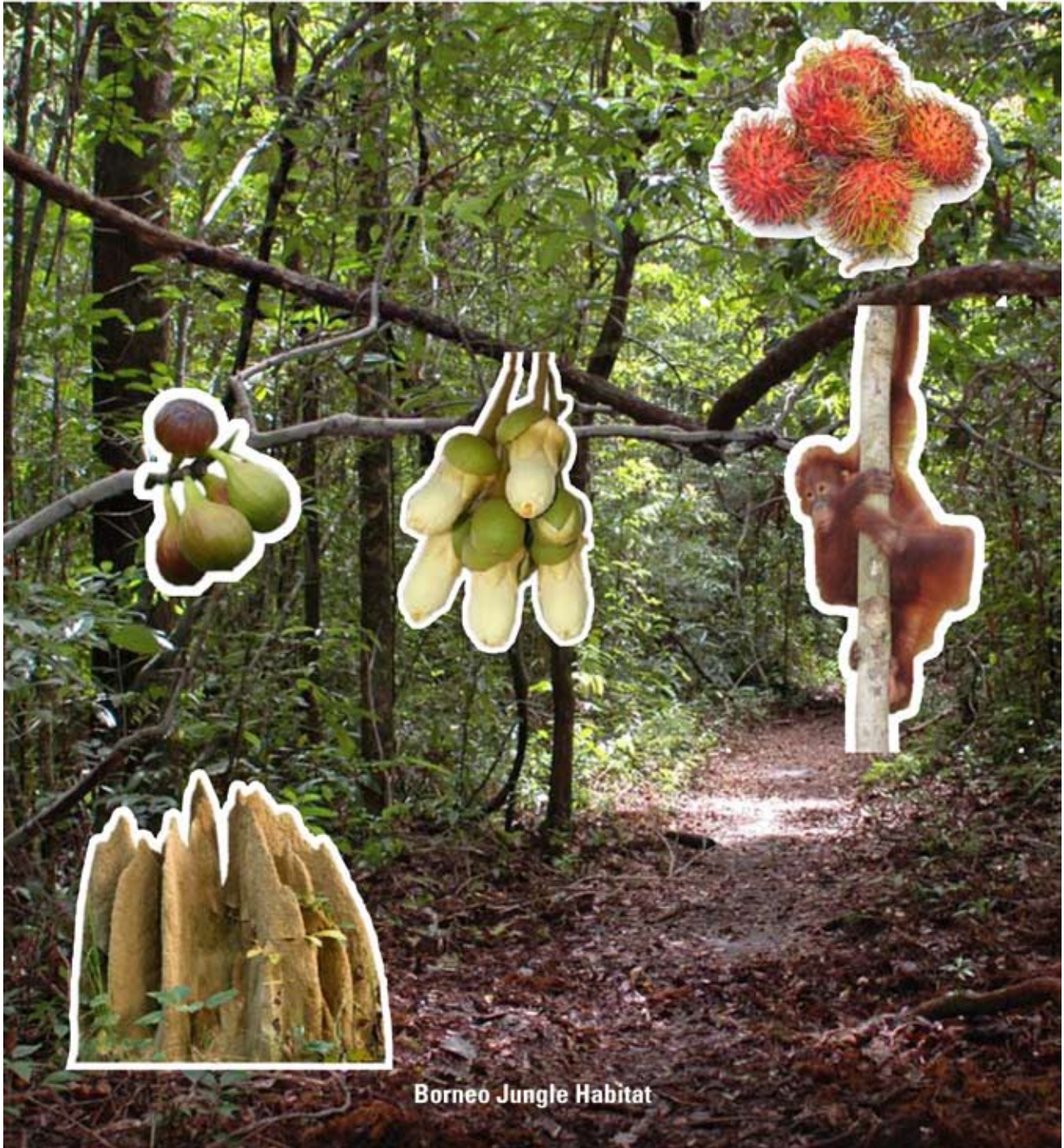


Durian fruit

Animal Habitats Answer Sheet



Animal Habitats Answer Sheet



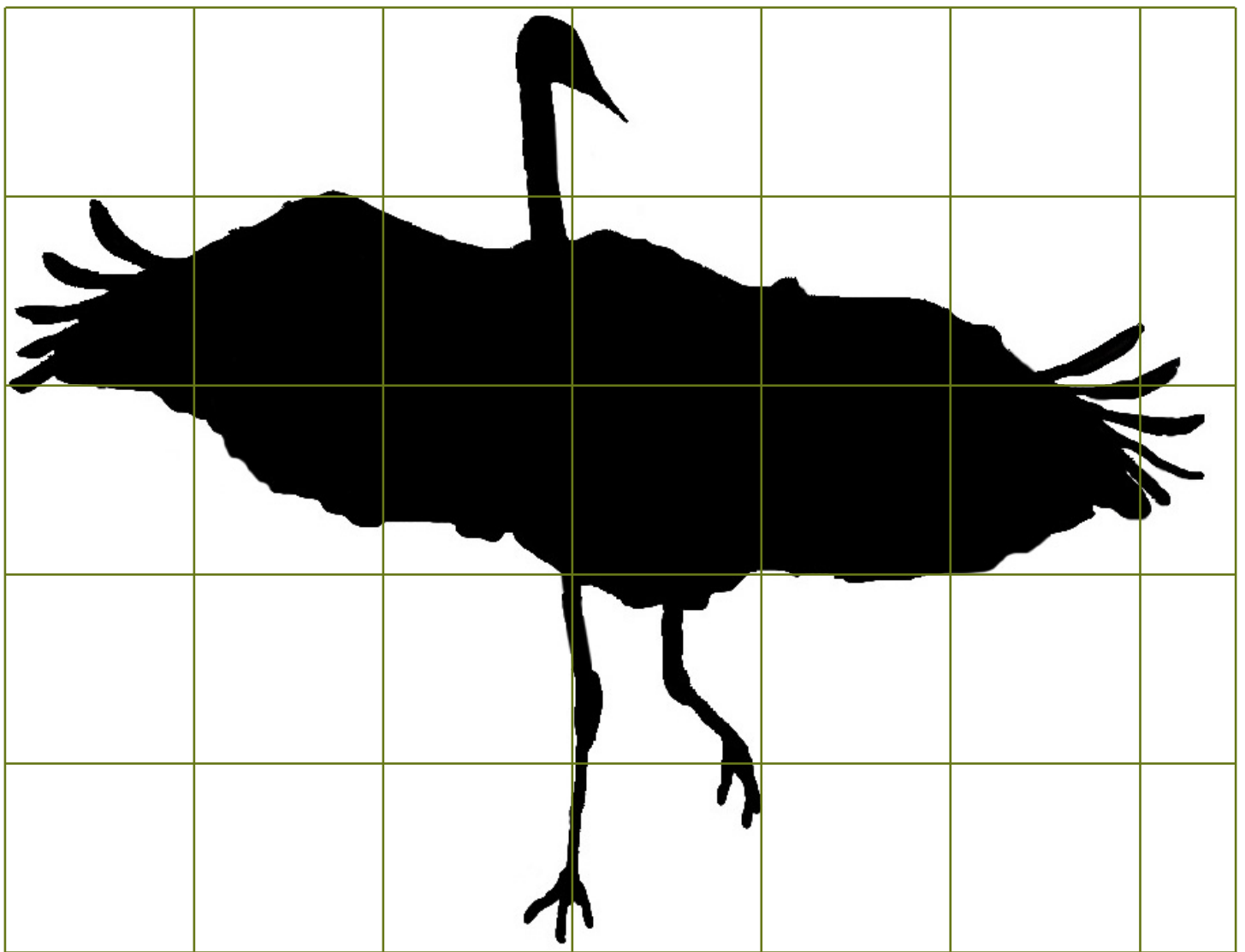
Life-size Whooping Crane Silhouette

Duration: 45 minutes

Worksheets: K to Grade 4

Whooping Crane Template

1 square = 30 centimetres (1 ft)



Whooping Crane Photos



Photo Credits

Durian Fruit: Brian IOH. License: <http://creativecommons.org/licenses/by-sa/2.0/deed.en>

Figs: Céréales Killer. License: <http://creativecommons.org/licenses/by-sa/3.0/deed.en>

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