



Duke Farms

Living Habitats

Lesson Plan: We All Need Something

An Instructor-Guided Lesson for Students Grades 4-5

NJCCS Addressed:

4	Organisms can only survive in environments in which their needs are met. Within ecosystems, organisms interact with and are dependent on their physical and living environment.	5.3.4.C.1	Predict the biotic and abiotic characteristics of an unfamiliar organism's habitat.
4	Some changes in ecosystems occur slowly, while others occur rapidly. Changes can affect life forms, including humans.	5.3.4.C.2	Explain the consequences of rapid ecosystem change (e.g., flooding, wind storms, snowfall, volcanic eruptions), and compare them to consequences of gradual ecosystem change (e.g., gradual increase or decrease in daily temperatures, change in yearly rainfall).
6	Various human activities have changed the capacity of the environment to support some life forms.	5.3.6.C.1	Explain the impact of meeting human needs and wants on local and global environments.
6	The number of organisms and populations an ecosystem can support depends on the biotic resources available and on abiotic factors, such as quantities of light and water, range of temperatures, and soil composition.	5.3.6.C.2	Predict the impact that altering biotic and abiotic factors has on an ecosystem.
6	All organisms cause changes in the ecosystem in which they live. If this change reduces another organism's access to resources, that organism may move to another location or die.	5.3.6.C.3	Describe how one population of organisms may affect other plants and/or animals in an ecosystem.

Common Core Standards: English Language Arts: SL4.1 – 4.3, SL5.1-5.3, SL6.1-6.3

Goal: Students will be able to identify the needs of an organism, identify if those needs are met within a natural area, and understand the impact on an organism when a habitat changes.

Objective: Students will identify the needs of a species and determine if an area is a suitable habitat for the species.

Objective: By playing a game students will identify the need for balance in an ecosystem as it relates to resources available for a species.

Objective: Students will be able to predict human impact, both positive and negative on a selected species.

Materials Needed:

- Clipboards with pencil/pen attached
- Duke Farms Eco-Kit (requires a \$250 refundable deposit) 1 per instructor, more if desired
- We All Need Something Lesson Plan and Activity Sheets – 1 per student
- Duke Farms Map – Available at Front Desk in Orientation Center

Duration: 2.5 hours

Distance traveled by foot: 3 miles

Vocabulary:

Habitat, Resources, Species, Ecosystem, Environment, Pollination

Procedure:

Introduction: (5 minutes)

Assemble students in the Orientation Center. Explain that they will be learning about Habitats today. They will be learning what happens to creatures that live in those habitats if a habitat gets out of balance. They will be playing a game and going on a hike to look for the parts of a habitat. Ask the students what they NEED to survive. (As they answer, be sure to differentiate between NEED and WANT!) Ask them what would happen if someone came in and ate all of the food out of their fridge each week before they could get to eat it. How would they solve this problem? What if there was only one very small room in their house and all of their family, cousins, grandparents, aunts, uncles, everyone, had to live in it? How could they solve this problem? Ask the students if they remember what a habitat is. (A habitat is a home for animals). Ask them to explain the parts of a habitat. What do all organisms need? (Food, Shelter, Water, Air and Space) Ask them what they think happens if there are too many animals and not enough food? What happens to the animals if the water becomes contaminated?

Introduction Activity: (15 minutes)

Visit the *Regenerating Habitats and Preserving Wildlife Exhibit* in the Orientation Center. This display is comprised of a number of 3 sided objects that rotate, containing information on each side. Have each student choose a square. On this square they will find a picture of the animal or plant featured, a brief description of the animal and its habitat and a more in-depth description of the animal in the ecosystem. Have the students review each side. On the most detailed side there is a small box in the lower left that

connects their organism to another they will find at Duke Farms. Have the students look specifically at that box. Ask them what organism they were reading about. Ask them what organism is connected to the original organism. Have them switch and do this activity again. Ask them what would happen to each organism if one of the others disappeared? Finally, have all the students focus on the Flicker. The Flicker relies on insects for food and the insects rely on flowers for food. Ask what they think would happen if any one of those disappears? (This relationship will be the basis for the game that will be played later).

Now assemble them at the front door of the Orientation Center. The restrooms are here. Please be sure they use the restrooms before you depart as facilities are limited on the rest of the grounds.

Activity: (1.5 hours)

1. Depart the Orientation Center from the Front Entrance. Make a right on the gravel path and follow it to the intersection with Habitat Lane. Bear Left to follow Habitat Lane to the intersection with Duke Parkway West. Cross Duke Parkway West at the Crosswalk and continue along Habitat Lane. After you go through the gate you will notice a set of boulder steps to the left, go down the boulder steps and into the wood chipped area next to Duke Brook. *Be careful! This is an open waterway. No one should get too close to the side of the water.* Stop here and keep an eye out for animals. Here is a great place to discuss the needs of animals in a habitat. Ask the students again what they NEED to survive (food, shelter, water, air, space). Ask the students if they understand the difference between a NEED and a WANT. Once they have a handle on what they NEED to survive, ask them to pick an animal they see or hear. Ask the students what those animals NEED to survive. The animals also need food, water, shelter, space and air. Ask the students where the animals get each of these things. Ask the students what happens if one of these things disappears. Once you have covered this topic return to the gravel path above the brook and continue left. Follow Habitat Lane. Along this lane you will find meadows and some woodland. Have each student choose a type of animal they see or hear (frog, bird, squirrel, bee, butterfly etc.). Have them write the name of that animal in the center of the circle on the Activity Sheet. In the box next to that circle have the student write the needs of the animal. Now have the students continue along the trail. As they go have them keep an eye out for all instances of their selected animal. See if they can figure out where their animal is getting its needs met. As they see each animal meeting the need, they should write the source of that need in the smaller circles around the name of the animal. For example: "Bird" is written in the middle of the circle. As the students walk the bird is flying around, they watch it eat insects out of the meadow. In the circle that corresponds to the number where they wrote food, they should write "insects from the meadow". They should try to watch that bird to see where it might have a shelter, where it finds water and where it gets air. This should continue throughout your walk. The students may not be able to keep track of the same exact bird but should be able to locate birds that look similar and follow their behavior to get the answers. Continue along Habitat Lane (be sure to explore the Habitat Hide) and bear right at the Blue Boy Statue onto West Lane. You will see another Habitat Hide on the left next to Duke Reservoir, explore that as well. You are now heading toward the grassy area near the Mermaid Pool. Here is where your next activity will begin.
2. Have the students put their clipboards down on the picnic table. You are now going to play a game called "Birds, Bees and Blooms" that will illustrate the importance of balance in an ecosystem and what happens when one of the resources of an ecosystem disappears. (See attached instructions for this game.) Remember to have the students write down the results of each round! When you finish as many rounds as you feel necessary for the students to understand the importance of balance and resources, have them sit at the picnic tables or in the

grass. Have the students study their results. Ask them how they interpret the results. Explain to them that this game represented an ecosystem that did not contain humans. How do they think the additions of humans would have changed their results? How would humans have hurt the species populations? How could they have helped?

3. After you finish the game and discussion, while you are at the Mermaid Pool you may want to take a look at the Floating Islands in the Mermaid Pool. Have a discussion about the suitability of these islands as a habitat. You may want to discuss how the excessive algae in the pond makes it an unsuitable habitat for fish because it takes away the air from the water. These floating islands help to reduce the amount of algae in the water to make a better habitat for fish.
4. Continue along West Lane. If you are in this area close to 12:30, please stop and watch the Great Falls Waterfall display from the Great Falls viewing area. Continue along until you can make a right to cross Vista Lake over a bridge. Follow this Way to Old Foundation Way. Circle around the Old Foundation heading down the steps and to Great Meadow Path. As you continue on Great Meadow Path continue to observe the species you selected. Continue to locate the species and find them using their habitats. Take note of the habitat areas. Are there places where the habitat seems insufficient to support the species you are observing?
5. From Great Meadow Path make a right on Ginkgo Lane and a left on Habitat Lane. Follow Habitat Lane back to the Orientation Center.

Conclusion:

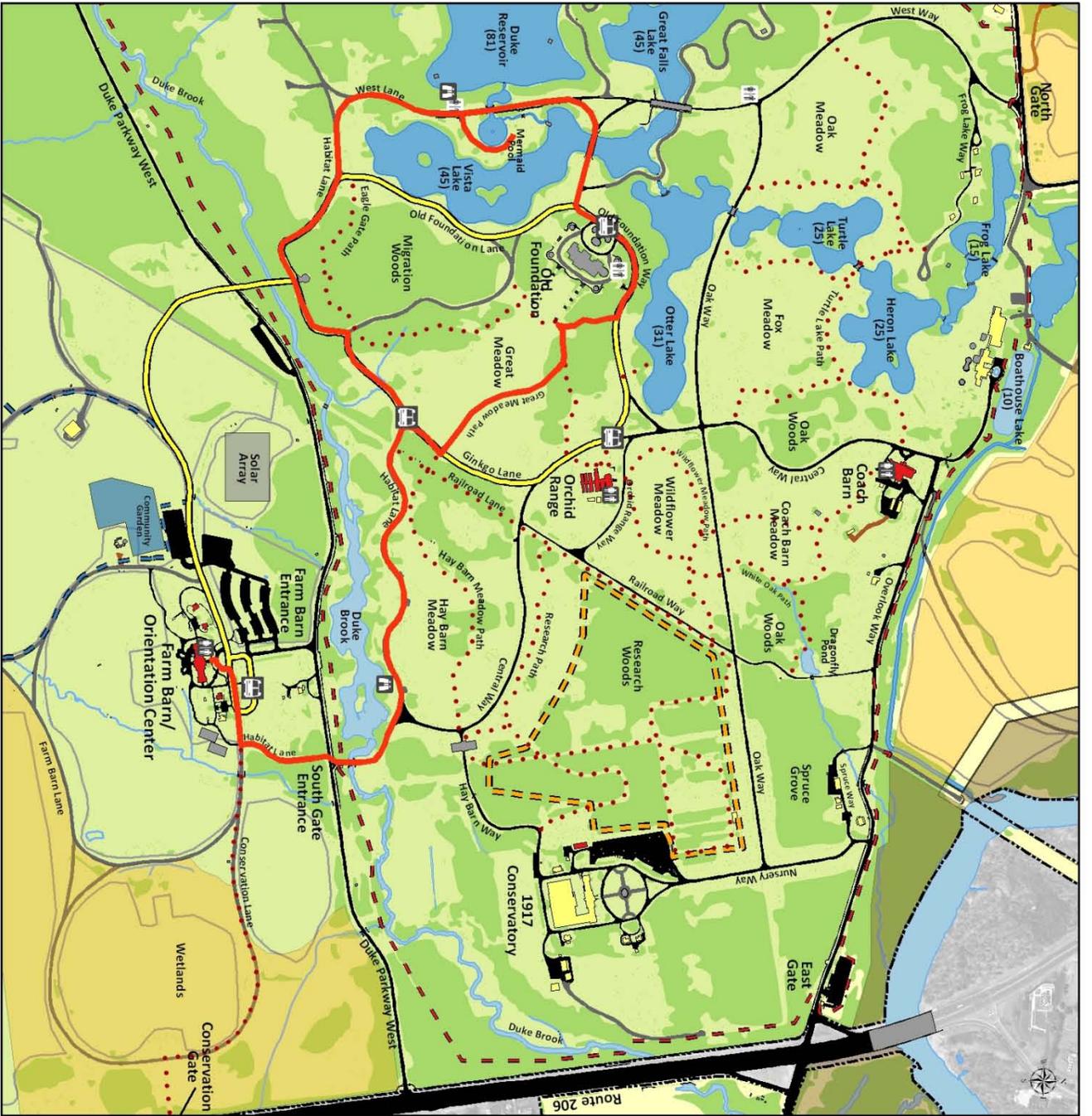
Have the students review their activity sheets with each other. Did they follow the same species? Can they conclude from their observations that Duke Farms is a good or a bad habitat for the species they followed? In other words, did they see their species accessing food, water, shelter, air and space? How do they think humans can help their species? How do they think humans can harm their species?

Do this at Home or at School:

The students can complete this type of hike on their school grounds or in their backyard. Now that they know what a species needs to survive, they should be able to locate the availability of these needs in any location. Have the students assess the suitability of the school yard or backyard for a species of their choice. Students may also teach their friends and family the Birds, Bees and Blooms game!

****DISCLAIMER****

Duke Farms serves as a habitat for native plants and animals. Care should be taken when exploring the grounds. Hazards such as open waterways, roadways with bicycles, poison ivy and stinging and biting insects are present on the property. Adults are responsible for the minors in their care. Precaution should be taken to avoid prolonged exposure to the sun as well as to biting and stinging insects. Participants should bring water with them. Participants should familiarize themselves with potential hazards and act accordingly. This is a carry-in, carry-out facility so all garbage created during your program should be taken back with you to your school.



We All Need Something

Grades: 4 - 5

-  Walk Route
-  Tram Loop
-  Tram Stops
-  Habitat Hides
-  Composting Toilets
-  Indoor Toilets

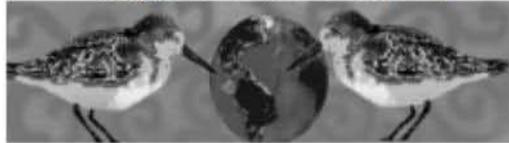
Distance:

3 Miles Roundtrip

Route:

- Front of Farm Barn to Pedestrian Entrance
- Continue on Habitat Lane along Duke Brook
- Right onto West Lane
- Walk around Mermaid Pool
- Right onto Old Foundation Way
- Right onto Great Meadow Path
- Right onto Gingko Lane
- Left onto Habitat Lane to return to Farm Barn





How to Use Binoculars

This information is adapted from the Sister Shorebird Schools Arctic Nesting Curriculum.

Teacher

Usually, we must account for a difference in eye strength when using binoculars. Center-focusing binoculars have an adjustment to compensate for eyes of unequal strength or vision. You will notice that only one eyepiece is independently adjustable, and it has a scale marked off in diopters, the optical measuring unit for spherical power. Note that the individual eyepiece setting, once adjusted, can be considered permanent. The scale reading should be noted and checked occasionally as it may be accidentally moved by handling or in moments of excitement.

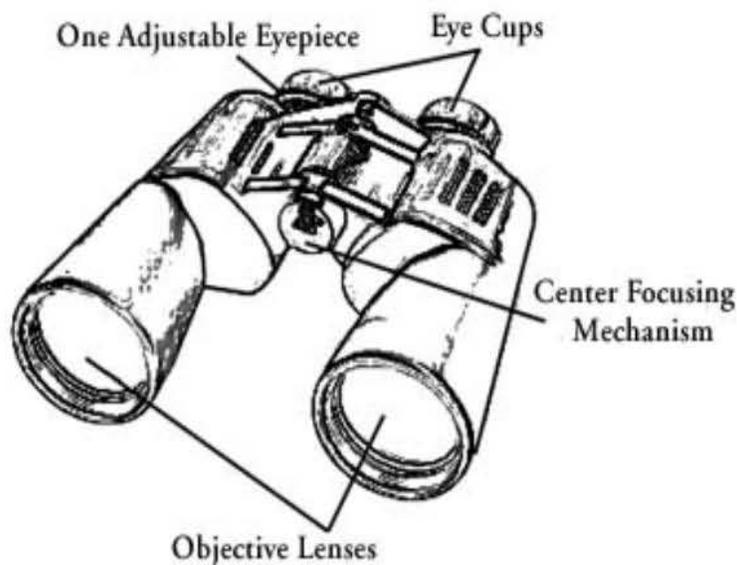
To adjust binoculars for any difference in the strength of your eyes, first, using the lens cover or your hand, cover the objective lens (the outer, big lens) which is on the same side as the adjustable eyepiece. With both eyes open to avoid distortion by squinting, look through the binoculars and, using the central focusing mechanism, focus on a distant object until it is sharp and clear. Now transfer the cover to the other objective lens. Again with both eyes open, but this time using the adjustable eyepiece, focus on the same object until it is clear.

Your binoculars are now properly focused for your use. Now, all you have to do is use the central focusing mechanism to focus for objects at various distances from you.

Focusing on moving objects and focusing quickly on something that is about to fly or move out of view are real challenges. If you practice, over time you will be surprised to find how your coordinated use of eyes and binoculars improves. Be patient and practice, practice, practice.

Another challenge is finding and focusing on objects in the sky. This is because the sky has depth, and there is not a background of objects (trees or horizon line) to use as reference points which both find your object and figure out what distance it is at.

Note that many binoculars have rubber eye cups which can fold down for use with glasses or sunglasses.



Teaching a Student to Use a Compass

Begin by teaching children the four basic directions: north, east, south and west. An easy way to help children remember these is to use mnemonic device, such as "Never Eat Shredded Wheat" or "Never Eat Soggy Waffles." Show children how each letter in the phrase stands for a direction (the "n" in "never" represents "north"), and teach them that the order of the directions in the mnemonic device is the same as the rotation of a clock's hands.

Show children a basic map, and introduce the compass rose (a one-dimensional representation of a compass typically featured in the corner of a map). The compass rose marks both the four directions and the four intermediary directions (northeast, southeast, southwest and northwest). Provide opportunities to practice reading intermediary directions on the map.

Show children a compass and explain that it will always point to the north. Allow children to practice turning their bodies in different directions and moving the compass to various locations, noting which direction the compass points each time.

Practice finding directions other than north. South is the easiest to find, since it's simply the opposite of north. If you want to go south, you just go the opposite of the way the compass is pointing. To find east, go to the right of the direction the compass points. To find west, go to the left of the compass arrow. You can play a "Which Way?" game in which you have children take three steps in one particular direction, then three steps in another direction, and so on, ending in a special predetermined location.

Once children are proficient at reading basic maps and using a simple compass, they can combine the two skills and begin using the compass to get from one location to another. This can be done by creating imaginary treasure hunts or embarking on trips to "mystery destinations" in the car, or through other fun practice games.

One authentic way to practice compass-reading skills is in the car. Have children determine the direction the vehicle is heading at each turn, and also in the context of the trip as a whole. For example, you might ask, "If we have to drive east to get to the school, which way will we drive to get home?" With large groups of children, you may put students in pairs or triads and have them share a compass, completing activities together while you facilitate discussion

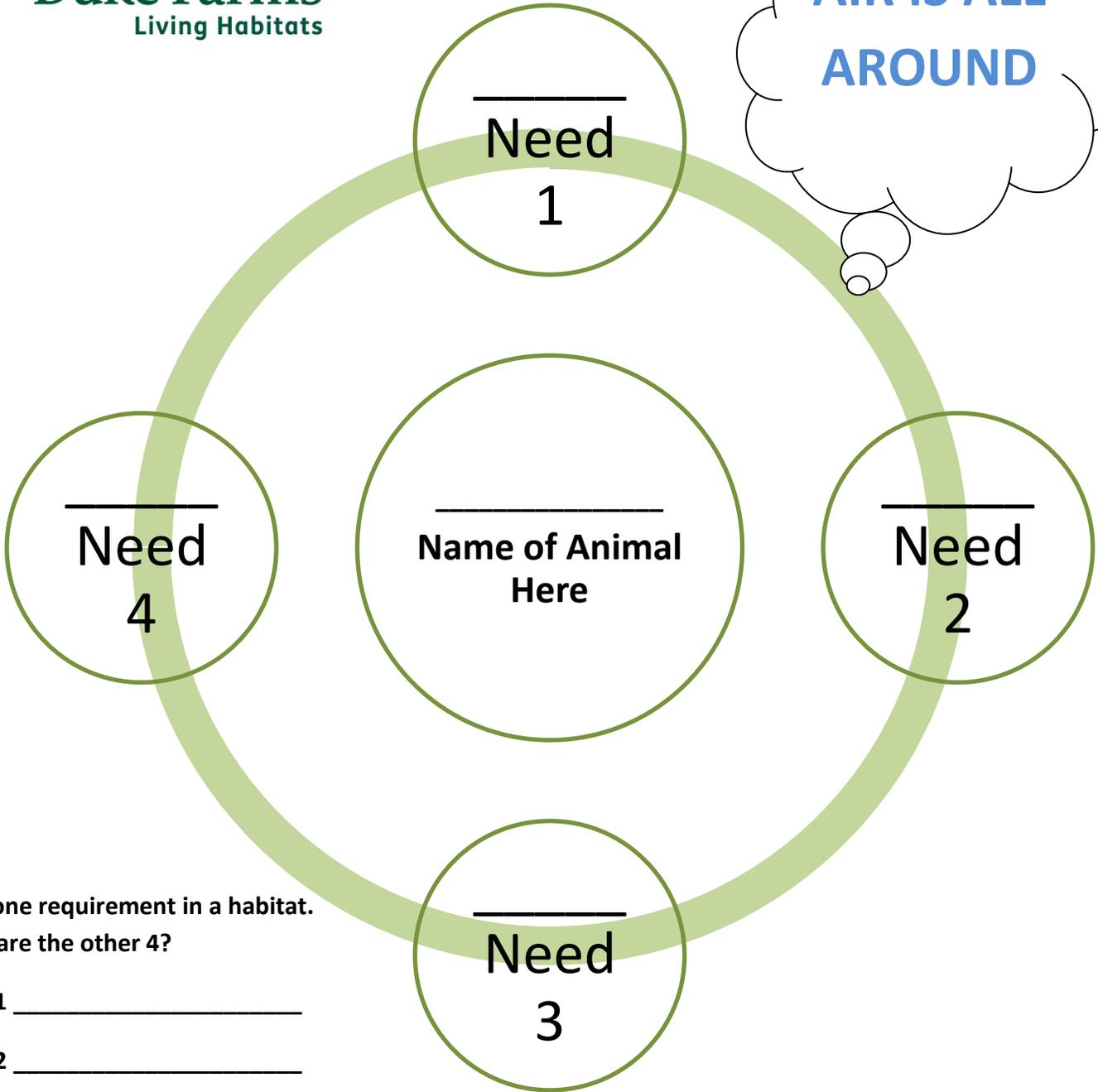
Read more: [How to Teach Children How to Use a Compass | eHow.com](http://www.ehow.com/how_4841689_teach-children-how-use-compass.html#ixzz1xg2eYsFm)
http://www.ehow.com/how_4841689_teach-children-how-use-compass.html#ixzz1xg2eYsFm



Duke Farms
Living Habitats

We All Need Something

Activity Sheet



Air is one requirement in a habitat.
What are the other 4?

Need 1 _____

Need 2 _____

Need 3 _____

Need 4 _____

We All Need Something Activity Sheet

Bird, Bee, Bloom Game Notes:

Round	Total # of Birds	Total # of Bees	Total # of Blooms	Results?
1				
2				
3				
4				
5				
6				
7				

1. Who was the successful species in:

- a. Round 1? _____ Why? _____
- b. Round 2? _____ Why? _____
- c. Round 3? _____ Why? _____
- d. Round 4? _____ Why? _____
- e. Round 5? _____ Why? _____
- f. Round 6? _____ Why? _____
- g. Round 7? _____ Why? _____

2. What did this exercise teach you about balance in an ecosystem?

Glossary:

Ecosystem - The interacting system of a community of organisms and their non-living environment

Environment - The external factors that affect the success of an organism.

Habitat- The place where an organism lives

Pollination - The process by which pollen is transferred in the reproduction of plants, thereby enabling fertilization and sexual reproduction

Resource - any physical or virtual entity of limited availability that needs to be consumed to obtain a benefit from it

Species - A group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding.

Birds, Bees and Blooms Game Instructions

Divide the group into three circles, one inside the next. The people in the outer circle are blooms (flowers), and remain stationary. The players in the inner circle are bees, and begin the game with one knee to the ground. The players in the middle circle are birds -they begin the game standing.

When you say "Go!" the bees have ten seconds to run and tag a bloom. They may avoid capture (being tagged by a bird) by "hiding" from the bird (touching one knee to the ground). Birds chase the bees and can "follow" an insect by turning 360° pivot during which the bee can run away. If a bee reaches a flower, the flower becomes a bee.

After each round, the results are noted. A successful animal (bird that eats an insect or a bee that gets nectar from and pollinates a flower) remains as that animal for the next game. A captured animal becomes the same animal as his captor. An unsuccessful but uncaptured animal (bee never got to the flower, but never got eaten by a bird) dies and becomes a flower.

Each round creates changes in populations and inter-relationships can be easily observed. A balanced game can go on indefinitely, but if birds become too efficient, the bees are wiped out whereupon the birds ultimately die. If the birds are inefficient they may be wiped out and large uncontrolled fluctuations can result in the bee population.

So:

Bird eats a Bee = Bee becomes a Bird

Bee eats nectar from flower = Flower becomes a Bee

Bird does not eat a Bee = Bird becomes a flower

Bee does not reach flower and is not eaten by bird = Bee becomes a flower

Flower is not reached by Bee = Flower remains a Flower

Message of this game:

An ecosystem is a balance of all resources. Students should be able to predict what will happen if there are too many birds, not enough bees, too many bees, not enough birds, or too few flowers. Students should also be able to formulate ways in which this balance of the ecosystem can be restored.