



# Wildlife Station - Lesson 1

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## Natural Resource Field Days

### Teacher/Volunteer Summary

*Adapted for NR Field Days from Project Wild, "Oh Deer"*

### Objectives

Students will (1) Identify and describe food, water and shelter as three essential components of habitat; (2) describe factors that influence carrying capacity; (3) define limiting factors and give examples and (4) recognize that some fluctuations in wildlife populations are natural as ecological systems undergo constant change.

### Method

Students portray deer and habitat components in a physical activity.

### Materials

Large outdoor field (large enough for running), whiteboard, eraser, whiteboard markers

### Background

Carrying capacity refers to the dynamic balance between the availability of habitat components and the number of animals the habitat can support. A variety of factors related to carrying capacity affect the ability of wildlife species to successfully reproduce and maintain their populations over time. The most fundamental of life's necessities for any animal are food, water, shelter and space in a suitable arrangement. Without these essential components animals cannot survive.

However, some naturally caused and culturally induced limiting factors serve to prevent wildlife populations from reproducing in numbers greater than the habitat can support. Diseases, predator-prey relationships, varying impacts of weather conditions from season to season (e.g., early freezing, heavy snows, flooding, drought), accidents, environmental pollution and habitat destruction and degradation are among these factors. An excess of such limiting factors leads to threatening, endangering, and eliminating whole species of animals.

This activity illustrates that

- good habitat is key to wildlife survival,
  - a population will continue to increase in a size until some limiting factors are imposed,
  - limiting factors contribute to fluctuations in wildlife populations,
- and
- nature is never in balance, but is constantly changing

Wildlife populations are not static. They continually fluctuate in response to a variety of stimulating and limiting factors. We tend to speak of limiting factors as applying to single species, although one factor may affect many species.

Natural limiting factors or those modeled after factors in natural systems, tend to maintain populations of species at levels within predictable ranges. This kind of “balance in nature” is not static but more like a teeter-totter than a balance. Some species fluctuate or cycle annually. Quail, for example, may start with a population of 100 pairs in early spring, grow to a population of 1,200 birds by late spring, and decline slowly to a winter population of 100 pairs again. This cycle appears to be almost totally controlled by the habitat components of food, water, shelter and space, which are also limiting factors. Habitat components are the most fundamental and the most critical of limiting factors in most natural settings.

This activity is a simple but powerful way for students to grasp some basic concepts: first, that everything in natural systems is interrelated; second, that populations of organisms are continuously affected by elements of their environment; third that populations of animals are continually changing in a process of maintaining dynamic equilibrium in natural systems.

### **Set Up**

All the materials needed for this activity will be in a bluish purple Rubbermaid tote. If it is not sitting in the meadow when you arrive it will be in a brown Jimmy or a brown Ford truck with a State of Utah seal.

### **Procedure**

1. Prior to the arrival of students, between the two of you decide whom will be keeping time and recording data and who will be lead teaching. You may switch duties after the first 20-minute activity.
2. As students begin approaching your station, gather and greet them (all four naturalists, from both rotations) in the road. Inform the teachers you will be splitting their large group (should be around 60) in half\*. Half will spend the first 20 minutes at the “*Oh Deer*” station and the other half will spend their first 20

minutes at the *"Incredible Journey"* station, then they will switch. Split the group in half, if need be ask teachers for assistance splitting the group in half.

***\*if group is 30 or smaller (single class) there is no need to split them in half***

3. When groups are split in half lead them to the area where their activity will take place (large meadow, look for Oh Deer signs).

4. After arriving at the Oh Deer meadow gather students around you. You may need to use a quiet sign to get their attention, have them sit down.

5. Welcome them to the wildlife station, introduce yourself and your team teaching naturalist. Tell them you are students at Utah State University and you are teaching as part of a class project. Let them know that the Utah Division of Wildlife Resources sponsors the wildlife station and you are also volunteering to teach today for the Division of Wildlife.

6. Ask students if they can describe what habitat is, tell them you are specifically looking for the four items that are important parts of habitat or four items all animals need in order to survive (food, water, shelter, space). Many will answer it is where an animal lives, this is only partly right. Tell them they are on the right track and prompt again with what four things they need in order to survive.

***\*if they have already been to *Incredible Journey*, remind them you focused a lot on water during the incredible journey, remind them that is only one component of habitat and ask them if they can tell you the other three.***

7. Tell students you have a fun activity/game that will help them understand how important habitat (food water, shelter and space) are to wildlife. Tell them they need to listen very carefully and quietly to the instructions so they will be able to play.

8. Choose six students to begin the game as deer, walk around your group and tap six kids on the head. These students are your deer; ask them to go stand behind the deer line.

9. Tell the rest of the students they are habitat. They can choose to become food, water or shelter. We are going to assume there is already enough space. Tell these students to go stand behind the habitat line.

10. Tell students the deer need to find food water and shelter in order to survive. When a deer is looking for water it puts its hooves over its mouth, when it is looking for food it puts its hooves over its stomach and when it is looking for shelter it puts its hooves over its head. Model these moves for the students and have them practice. Tell students a deer can look for only one of its needs per round and cannot change its mind if it cannot find what it is looking for. If the deer finds its habitat need it survives and takes that habitat need back to the deer

line (the habitat need becomes a deer for the next round). If the deer cannot find its habitat need it dies and becomes habitat (deer dies and stays on the habitat line for next round).

11. Tell the habitat when they choose what habitat need they would like to be they use the same sign as the deer (review signs). Habitat will be asked to choose what they will be at the beginning of each round. They are not allowed to change their sign during play, only at the beginning of a new round. If a deer sign matches your sign and you are used, you return to the deer line with the deer and become a deer. If the deer does not use you, you remain habitat for the next round.

12. Begin the first round by having students turn their backs to each other. Ask students to choose their signs (give them a couple seconds) and on the count of three turn around.

13. The habitat line and deer line should turn around and face each other. Habitat needs have to stand still, the deer can begin migrating towards a matching sign. Capturing a matching signs means the deer has fulfilled its needs and survives and reproduced, taking itself and the need back to the deer line. If the deer fail to capture a matching sign they die and become habitat for the next round.

Note: when more than one deer arrives at a habitat need, the deer that arrives first survives.

14. Record the number of deer at the beginning of each round. Continue rounds as time allows. Save 5 minutes to review at the end.

15. At the end of the rounds gather students near the white board (second naturalist should have the deer population graphed). Encourage students to talk about what they experienced and saw. For example they started with a small heard of deer and had more than enough habitat to survive. However because more and more deer survived and reproduced eventually there was not enough habitat and deer began to die.

16. Refer to the chart and review the ups and downs of the deer population (visual reminder).

17. Ask students if something like this would happen to Utah deer in real life (YES!). Tell them that the Utah Division of Wildlife Resources works really hard to help nature support healthy deer populations. Ask students what are some things people can do if there are too many deer for the habitat (hard to know when this is the case: hunt, with appropriate season and license, decrease hunting of predators). What can they do if there is not enough habitat (volunteer for habitat projects with the division to plant habitat or restore it in places where it is needed, DO NOT FEED DEER it may be fun at first but once you start deer will

rely on you and die when you stop, they also can not utilize a lot of the feed people like to give them and it is best to let nature “balance” its self out like it did in the game) Call UDWR if they have questions about deer in their neighborhood.

18. Tell students than you they did great, have them clap for themselves and their classmates and direct them to the “Incredible Journey” rotation

### **Clean Up**

After the last rotation is taught please return the white board markers, easel and any other supplies to the Rubbermaid tote and place in brown UDWR vehicle.



# Wildlife Station - Lesson 2

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Natural Resource Field Days  
Teacher/Volunteer Summary

**Grade Level(s):** 4<sup>th</sup> Grade

**Subject:** Avian Adaptations

**Description:** This is an activity designed to provide students with a hands-on activity to help them explore animal adaptations, namely the shape of a bird's beak in relation to their food source.

**Overarching Goal:** Gain in understanding of diversity and adaptations of organisms through an exploration of bird beaks.

**Objectives:**

Students will:

1. Comprehend that birds have physically adapted in relation to their type of food supply.
2. Deduce what beaks are most efficient for given foods by experimenting with imitation beaks and given food sources.
3. Describe what will happen to a bird population if its environment could no longer support the bird's food source.
4. Comprehend that *adaptation* is the change of a population over time.
5. Comprehend that the avian skull is comprised of a skull, upper mandible, and lower mandible.
6. Identify 5 bird bill types and function (seed-eating, terrestrial insect-eating, aquatic insect-eating, flesh-eating, straining, chiseling, fish-eating/spearing, fish-eating/capturing).

**Materials:**

- **Beaks:** 2 eyedroppers, 1 pliers, 5 sets of chopsticks, 4 tweezers, 1 shoestring, 1 sponge strip, 1 straw, 1 wrench, 2 slotted spoons, 1 strainer, 3 tongs, 1 envelope, 1 turkey skewer;
- **Food:** colored water in a long narrow container, gummy worms, sunflower seeds, styrofoam cubes, popped popcorn, rice, marshmallows, loose tea; and

- **Other:** 6 foot table, dry erase board, bird photos, potting soil, shallow pans, 8 boxes, data tables for each student, 8 cups, vase or graduated cylinder, pictures of various birds with corresponding environment/habitat and food source

**Procedure:**

Time	Instruction/Methods/Explanation	Materials
10 minutes	<p><i>Scientific Explanation:</i> What are animal adaptations? Animal adaptations are any body shape, process, or behavior that allows an organism to survive in its environment. Animals change over time to fit the needs of their environment. Why do birds have different shaped beaks? Birds have many different kinds of beaks, depending on what they eat and where their food source is. For instance, birds may find their food in water, mud, flowers, seeds, or in wood. A hummingbird has a long, thin bill that allows it to sip the nectar from inside flowers. The different shapes of beaks allow easier access to these various food supplies. If an environment was altered, organisms within the area would need to change or <i>adapt</i> in order to survive.</p> <p><i>Extinction</i> is the complete loss of a species. For example: The Dodo is the classic case of extinction of a vulnerable bird species by human beings in the 16<sup>th</sup> century. Once living on a remote tropical island in the Indian Ocean, the Dodo was a large, flightless, turkey-sized pigeon that ate fruit and grew fat. The Dodo (name indicates stupidity) was easily captured by sailors as a convenient source of food. The Dodo did NOT adapt flight capability or did NOT learn to fear humans quickly enough to survive in their changing environment.</p> <p><i>Focus Phase:</i> Adaptation basically means organisms changes in order to better live in their environment. Examples of adaptation can be physical or behavioral. (In the case of the Dodo bird, adaptation to the rapidly changing environment required both physical (developing larger pectoral muscles for flight) and behavioral (learning fear of humans). Besides the example of the Dodo bird, can you think of any examples of other behavioral adaptations in birds? (migration, colonialism, territoriality, etc.) Can any of you think of examples of a bird's physical characteristics</p>	<p>1. Picture of Dodo bird skull and artist's rendition</p> <p>2. Vocabulary cards: natural selection, adaptive radiation, extinction</p>

	that helps them to survive? (Make a list on the dry board.).	
5 minutes	<p>What do birds need to survive? What kinds of food do they think birds eat? (Insects, seeds, berries, and meat are among the most common.).</p> <p>Examine an avian skull. Identify the brain case, upper/lower mandibles, and eye orbits. Show an example of an adaptive bill to food source.</p> <p>According to the theory of “survival of the fittest”, the individuals with the best combinations of inherited traits were the most likely to survive and reproduce. Natural selection means that over time, populations of these animals are more numerous than populations without special adaptations. Adaptations are what make a heron better at catching fish than a woodpecker. Living organisms are often adapted in several different ways to the environment in which they live and can accommodate to a range of environmental conditions.</p> <p>The finch's beak has repeatedly adapted to changing environments. The owl has a disc shaped face that allows them to have incredible hearing for hunting. The Clark's Nutcracker has a beak that is exactly long enough to plant white bark pine seeds when the bird is storing food for later in the ground. The crossbill has a beak that allows it to open strong pinecones.</p> <p><i>Challenge Phase:</i></p> <p>In front of the class, arrange:</p> <ol style="list-style-type: none"> <li>1. A tall, thin vase filled with colored water.</li> <li>2. A dish of oatmeal with gummy worms buried throughout.</li> <li>3. Sunflower seeds spread throughout a pan.</li> <li>4. A dish of water with rice puff floating in shallow water.</li> <li>5. A dish of water with loose-leaf tea or herbs.</li> <li>6. Popped popcorn</li> <li>7. Rice grains tucked into the bark of a log</li> <li>8. Marshmallows skewered on wooden kabob holders</li> </ol>	<ol style="list-style-type: none"> <li>1. Dry erase board</li> <li>2. Challenge cards</li> <li>3. Stop watch</li> <li>4. Set of 9 example birds demonstrating each type of bill or skull type for each challenge</li> </ol> <p>Roseate spoonbill skull</p> <ol style="list-style-type: none"> <li>1. Vase with colored water</li> <li>2. Dish of oatmeal with gummy worms</li> <li>3. Seeds spread out on</li> </ol>

	<p>9. McDonald's Happy Meal</p> <p>Tell students that each of these items represents a type of food eaten by various birds. Ask students if they can hypothesize what each bird would have to do in order to reach their food supply. Does the shape of a bird's beak limit their food supply?</p> <p>Note:</p> <ol style="list-style-type: none"> <li>1. Nectar (colored water) will need to be sucked out. (Hummingbird)</li> <li>2. Worms (gummy worms) need to be dug and pulled out.</li> <li>3. Seeds (sunflower seeds) need to be cracked open. (Sparrows, Finches)</li> <li>4. Fish (rice) will probably need to be scooped out of the water. (Heron)</li> <li>5. Fine bits of vegetation (tea or herbs) will need to be carefully scooped out of water. (Waterfowl-Ducks, Geese, Swans)</li> <li>6. Flying insects (popcorn) need to be caught in wide openings. (Swallows)</li> <li>7. Small insects (rice) will need to be picked and pried out of small crevices. (Woodpeckers)</li> <li>8. Meat (marshmallows) will need to be pulled off of bones. (Owls, Hawks)</li> <li>9. Trash food (miscellaneous) can be cut up with Swiss Army knife.</li> </ol> <p>Divide students into 3 groups (there will be nine different group challenges). Assign students their "challenges" and equipment for each group. (Each group gets a different food source and a set of three different utensils, which they are to use as sample "beaks.") After reading their card, ask students to identify which "beak" they predict will work best for "eating" their specific "food". Groups will be given 5 minutes to explore the ease of getting "food" with their utensils. (Have students see their challenge cards).</p>	<p>a pan</p> <ol style="list-style-type: none"> <li>4. Dish of water with rice puffs</li> <li>5. Dish of water with tea leaves</li> <li>6. Popcorn</li> <li>7. Rice grains hidden in bark of log</li> <li>8. Marshmallows on skewers</li> <li>9. McDonalds Happy Meal/trash food</li> </ol>
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*Application Phase:*

*Challenge #1*

You have been given a graduated cylinder as a food source. You have also been given sample beaks: 1) a shoestring, 2) a medicine dropper, and 3) a sponge strip. Your challenge is to find out how which "beak" it takes to most easily get 5 mL of water from the graduated cylinder to the cup.

*Challenge #2*

You have been given gummy worms as your food source. You have also been given sample beaks: 1) a straw, 2) chopsticks, and 3) a wrench. Your challenge is to find out which beak it takes to remove the gummy worms from the oatmeal.

*Challenge #3*

You have been given sunflower seeds as your food source. You have also been given sample beaks: 1) pliers, 2) chopsticks, and 3) tweezers. Your challenge is to find out which beak it takes to crack the shell and remove the seed inside.

*Challenge #4*

You have been given floating rice puffs as your food source. You have also been given sample beaks: 1) chopsticks, 2) tweezers, and 3) a slotted spoon. Your challenge is to find out how which "beak" it takes to remove all of the rice puffs from the water.

*Challenge #5*

You have been given tea as your food source. You have also been provided sample beaks: 1) a slotted spoon, 2) a strainer, and 3) tweezers. Your challenge is to find out which beak it takes to get all of the tea from the water.

*Challenge #6*

You have been given popped popcorn as your food source. You have also been provided sample beaks: 1) tongs, 2) an envelope, and 3) chopsticks. A group member will gently toss some kernels into the air. Your challenge is to find out which "beak" captures 5 kernels most easily. The kernels must be caught while they are in the air.

*Challenge #7*

You have been given rice as your food source. You have also been provided sample beaks: 1) a medicine dropper, 2) tongs, and 3) tweezers. Your challenge is to find out which "beak" removes 15 grains of rice from the bark of a tree most easily.

*Challenge #8*

You have been given skewered marshmallows as your food source. You have also been provided sample beaks: 1) chopsticks, 2) tongs, and 3) a turkey skewer. Your challenge is to find which "beak" removes five marshmallows from the skewers most easily. Try this several times.

*Challenge 9:*

You have been given a food trash as your food source. You have also been provided sample beaks: 1) chopsticks, 2) tongs, and 3) a Swiss Army knife. Your challenge is to find out how easily the "beak" can cut up the food.

5 minutes

*Assessment:*

Have students support or clarify which "beak" matched with a given food supply. Look around the wetland environment and predict which bills are best suited to obtaining food (i.e., wet soils, open water, grassland, emergent vegetation leaves, insects) and identify the birds that might consume those foods (i.e., white-faced ibis, mallard duck, long-billed curlew, Canada geese, swallows). Which birds are more specialized with their adaptive bills? Which are generalists?

As a final question, ask students to relate what might happen to a bird population if its natural environment experienced a natural disaster where all the flora or fauna were wiped out. What would happen if a farmer used an insecticide that killed off all the insects? What would happen to woodpeckers or other birds that eat small bugs? What would happen if the old trees and snags were cut down? Where would osprey and eagles watch for their meal?