



Birds, Beaks & Adaptations

In a Nutshell



Students will investigate bird adaptations first-hand by rotating through a series of feeding stations. Using a tool that simulates one style of bird beak, they will learn how adaptations connect birds to certain habitats and behaviors. Students will then take binoculars on a hike to observe other bird adaptations and behavior.

Grade	2-6
Season	Fall, Winter, Spring
Location	Rapids Lake Education Center & Bloomington Visitor Center

Learning Objectives

After these activities, students will be able to:

- Identify different parts of the bird
- Understand how to properly use binoculars.
- Explain differences in birds using their four common identifying features
- Describe the type of food a particular bird eats based on beak design.
- Identify at least two other physical features that connect birds to the habitats they live in.
- Successfully use binoculars to locate and focus on a bird.

Literature Connections

- ***Beaks*** By Sneed B. Collard III
- ***Bird*** by David Andrew Burnie
- ***What Do You Do with a Tail Like This?*** by [Robin Page](#)
- ***Fine Feathered Friends: All about Birds*** by [Tish Rabe](#)
- ***She's Wearing a Dead Bird on Her Head!*** by [Kathryn Lasky](#) & [David Catrow](#)
- ***Unbeatable Beaks*** by Stephen R. Swinburne

Pre-Activities

Students will learn what makes birds different from other animals and be introduced to the activity of birding. Students will identify characteristics of birds based on color, shape and size. Students will also learn the basic anatomy of birds. Using observation, communication and critical thinking skills, students will identify bird characteristics and demonstrate what they have learned through a drawing activity.

On-site Activities

Using different tools, students will learn about different bird beak styles and describe how these beaks are adapted to feed on different types of food found in different habitats.



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Students will then utilize binoculars to locate, observe, and identify birds while hiking on the refuge.

Classroom Connection

Project WILD activity, Adaptation Artistry (5-8)

Students will identify and describe the advantages and evaluate the importance of bird adaptations. * *This activity is easily adapted for younger students.*

Project WILD activity, Seeing is Believing (K-4)

Students will identify vision as one example of an adaptation and describe the importance of vision adaptations to animals.

Teacher Resources

- ***Peterson Field Guide to Eastern & Central American Birds*** by Roger Peterson
- ***One Thousand Facts on Birds*** by Jinny Johnson



Birds, Beaks and Adaptations Pre-visit Activities

Materials

- Variety of MN bird pictures (birds of prey, songbirds, waterfowl)
- Silhouettes of birds (11x17)
- Blue Jay diagram marking features (11x17)
- Crow, Robin, White-throated sparrow cut-outs for size comparison
- Bird Anatomy worksheet (1 per pair of students)
- Scratch Paper
- Crayons/Colored pencils
- Wet erase markers
- *Birds of Minnesota* by Stan Tekiela (1 copy per group)
- *Young Birder's Guide* by Bill Thompson III (1 copy per group)
- Set of "Mystery Bird Detective Cases" #1-10
- Laminated pictures of mystery birds
- Mystery bird case answer sheet

Introduction

(25 min)

Introduce students to the biology of birds by asking them the one feature that makes birds different from other animals (*feathers*). While most birds use feathers to support flight, a few birds like the ostrich and penguin use their feathers for other reasons. Penguins use their feathers for warmth as they swim through icy water, while an ostrich uses its feathers for balance while running and for display during courtship.

Most birds are lightweight and have strong wing muscles, which helps with flying and quick take-offs. Birds are found in a variety of shapes, colors, and sizes. Many songbirds can be heard using a variety of songs to communicate. Male songbirds also typically display bright vibrant colors used to attract mates. Other birds, like raptors (*hawks, eagles, owls*), are adapted to blend into their surroundings (*camouflage*), have sharp talons, and sharp, hooked beaks, and keen eyesight used for hunting.

Show students the different pictures of birds. Ask them to identify physical characteristics of the bird (*feathers, tail, wings, etc.*). As they list characteristics, write their observations on a large board. Make sure to include behavioral characteristics the students mention as these are also important and helpful for identification (*bird is singing, perching, eating, flying, etc.*).

Tell students that noticing common features and behaviors is a method people use to identify birds. Ask students to think about the most important features they notice when watching a bird. As a group, encourage students to number the items on the class list in the order of importance (1 being of the greatest importance). The importance level determined is neither right nor wrong; it depends on what the students feel is most important and prompts discussions about bird identification.



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Now explain to students there are generally 3 key characteristics people look for when identifying birds: **color**, **size**, and **shape**. Compare their list to these 3 characteristics using the silhouettes picture and the crow, robin, sparrow cut-outs. Did students choose items that reflect the 3 key characteristics?

Activity

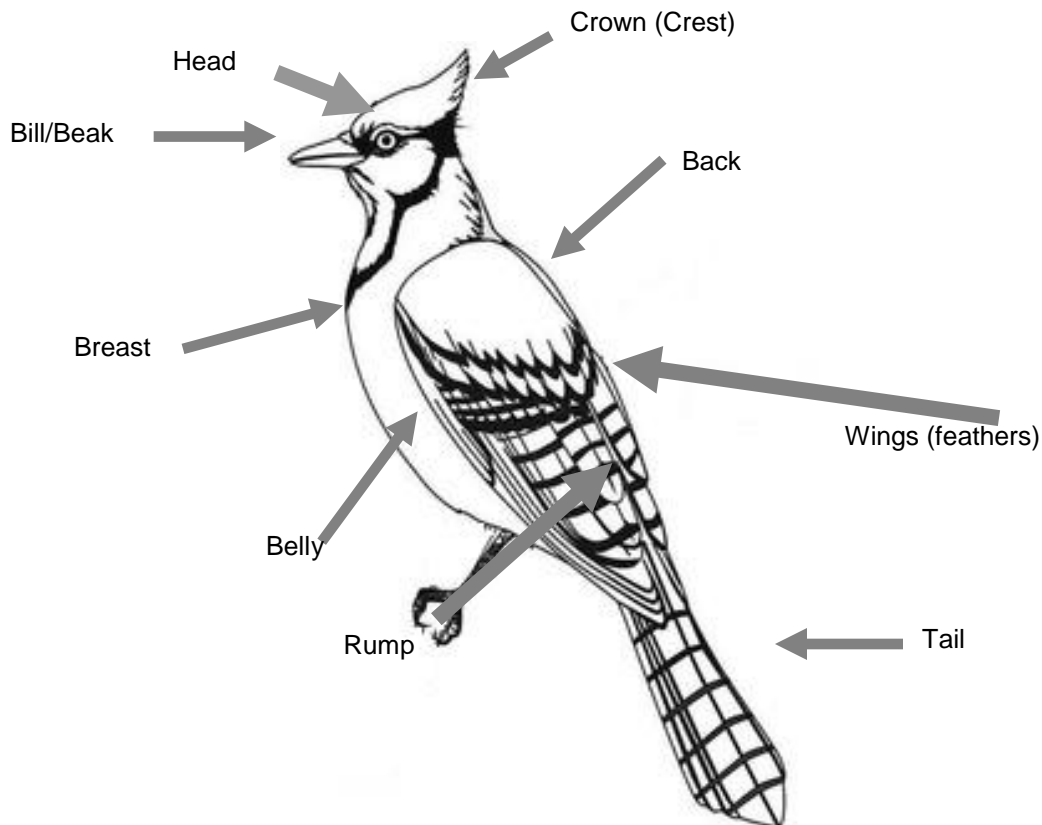
(30 min)

Getting to know a bird

Sometimes identifying one bird from another bird can be tricky. Many birds may look the same, or be a similar size. There are ways to narrow down what type of bird you may be observing.

Introduce students to the main parts (*features*) of a bird. These features are often referenced when describing a bird. Pass out a copy of the bird anatomy worksheet and a wet erase marker per pair of students. Ask students to work with their partner to fill it in the best they can using the key words at the top.

Once everyone has had time to work on it, review the worksheet with the class using the Blue Jay diagram to help students locate the most notable features. While pointing out these terms to students, explain this is a good way to describe bird features they notice to someone else.



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Learning how to describe characteristics of a bird and being able to share the characteristics using common terminology is important for identification. Based on the parts of the bird students learned, they should use these terms to complete the following age appropriate description activity.

Activity #1 (*best activity to do if younger students*)

After students appear comfortable with naming the common bird parts, engage them in an activity that will use observation, communication and thinking skills. Instruct each student to sketch and color a bird of their choice. Each student's drawing must include the main bird features illustrated on the worksheet. Provide photos or let them use one of the field guides for examples. Reassure students ***that it does not matter how well the bird is drawn or whether they draw a real or an imaginary bird.*** Tell them not to share their picture until the second portion the activity is complete.

Have students get into pairs and sit back to back so they are unable to see each other's work. Ask one student to describe the bird they drew, focusing on unique features, as the other student draws the bird being described. Sitting back to back will challenge students to communicate clearly and visualize carefully as each bird is described. This will build important observation skills which are used by bird watchers to identify birds using a field guide. The more descriptive a student is, the more successful his/her partner will be at drawing a picture that matches the original drawing. When both students have had a turn, they should compare the original drawings with the new drawings. Were they successful in drawing the same or similar bird? Explain that good observation and communication skills help birdwatchers describe the birds they see to other people.

Activity #2

People often refer to bird guides to help them determine the type of bird they may have seen in a forest, at the park or visiting a bird feeder. Guides are great tools that have been developed by people using common body part terms, photos and quick facts about where birds live, their habits, the food they eat and what time of year they may be seen in certain regions.

For this activity students will become bird detectives, and use the terms they just learned and their reading skills to decipher a description of a bird.

1. Assign students into groups of 2-3 depending on the class size (*there are 10 mystery bird cases*). Provide each group with a Mystery Bird Case Number, a wet erase marker, scratch paper, color pencils, and one of each type of field guide. Each group needs to read their case together and fill out the report using what they might already know as well as the field guides for help.
2. Explain to students the field guides are not all designed the same. Briefly review the differences between the two guides and encourage students to page through each book to note their similarities and differences.



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3. Explain the worksheet to students. When trying to identify the mystery bird it is recommended for students to begin using the Birds of Minnesota Field Guide as the birds are categorized based on the dominant colors of the birds. Student can compare information from both books to fill in their case report.
4. When the students have completed the mystery case, give them the laminated picture of their bird to sketch/color. Once everyone is done, ask each group to share their mystery bird with the class. Hold up the corresponding mystery bird large photo for the class to see while the detective group reads aloud their bird description and provides the answers to their case report and interesting fact.

Wrap Up (10 min)

Understanding why people watch birds

Many people enjoy birds. When people watch birds, they are participating in a common activity known as birding. People that watch birds for a hobby are often referred to as birders. Bird watching is a challenging yet fun activity that can happen almost anywhere outside. Plus, as people observe birds they can monitor changes happening in the natural environment. Many birds of all type and variety are good signs that the environment is healthy enough to support birds. If birds are no longer seen in quantity and variety where they once were abundant, this may be an indicator that something is not right in the natural environment and scientist may need to further investigate.

Ask students to think about places where they may look for birds. Most people can see some type of bird from their window at home, in a park, or a schoolyard, as birds are almost everywhere. No matter what type of bird you are looking for, bird watching is enjoyable and can be exciting.

Share with students the plan for their trip to the National Wildlife Refuge. The National Wildlife Refuge is a special place where animals live in a natural setting, including many common birds found in Minnesota. While on the Refuge, students will learn how to look for, listen for and identify some very common song birds found in Minnesota. Students will test their new skills using binoculars during a bird watching hike to observe refuge birds. Advise students that much of their fieldtrip will be outside, and to dress appropriately for the weather.



Birds, Beaks and Adaptations On-site Activities

Materials

- 2 containers of water:
 - 1 – shallow (2" of water)
 - 1 – deep (10" or more of water)
- 1 pie pan
- 4+ tweezers
- 4+ short handled tongs
- 4+ long handled tongs
- 4+ pliers
- Rice
- Beads and plastic fish (to sink in "pond")
- Sunflower seeds
- 1 stump with holes in it (to hold rice)
- Floating objects (cut up ½ inch long straws work well)
- Cups to use as a "stomach" to put eaten food in
- Habitat Record Sheet
- Pictures of different bird beaks
- Variety of MN bird pictures (birds of prey, songbirds, waterfowl – *in pre-activity bin*)
- Bird behavior scavenger hunt (*in pre-activity bin*)
- *Field Guide to Birds of North America* by Kenn Kaufman
- Binoculars- one per student

Introduction

(20 min)

Explain to the students that first they will rotate through a series of learning stations to discover how a bird's food preference is based on its beak shape. Then they will participate in a hike on the refuge to observe birds and their behaviors using binoculars.

Birds Beak Activity

A bird's beak is a unique and multi-functional tool. It can help a bird gather or capture food, communicate, groom feathers, defend territories, and attack rivals. The shape of a bird's beak is a clue to its main source of food. The shape of a bird's beak is designed for eating particular types of food such as: seeds, fruit, insects, nectar, fish, or small mammals.

Bird beaks have adapted over time to help birds find food within their habitat which allows them to survive. The following are examples of bird beaks that may have evolved over a long period of time and demonstrate a particular adaptation:

- **Cardinal and grosbeak** – have short, thick, cone-shaped beaks to crack seeds.
- **Woodpeckers** – have thin, chisel-type beaks to search out insects in trees.
- **Loons, herons, terns, and bitterns** – have straight, pointed bills to spear prey (ex: fish)
- **Hummingbirds** – have straw-like beak used to suck up nectar from flowers.
- **Raptors** – have hook-like beaks used to tear apart small prey such as mice.



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Explain to students for this activity the class will “become” different types of birds. Show them the different “beaks” (tools) they will use: long and short handled tongs, tweezers, and pliers. Explain to the students their job is to find the proper habitat suited for each bird. Mention that the tools or “beaks” provide a clue to what a bird may eat and where it may live.

Show students four simulated habitats (marsh, pond, prairie, forest). As you show each habitat, give a short description of it to create an image.

Divide students into groups of four. Each student or group should receive a different tool (i.e. one group receives pliers, one group receives tweezers, etc.) and a “stomach” (cup). Each group, or student, must keep the same tool throughout the entire activity.

Line each team up at a station and explain how they will move from one habitat station to the next. Rotations will continue (when you say “rotate”) until all groups have had a chance at trying to “eat” at all the habitats.

Groups should be given 30 seconds at each habitat to “eat” as many food items as possible. Each student **must** keep one hand behind their back and must not let their hand get wet. After 30 seconds, tell students to “rotate”. Students must stop “eating” and move to the next “habitat.” When students arrive at their new station, tell them to “eat”, allow 30 seconds of eating time in the new habitat.

***** MAY ONLY TAKE ONE PIECE OF FOOD AT A TIME *****
(one piece of rice, one sunflower seed, one bead/fish, one straw)

For food to qualify as “eaten”:

Marsh = floating objects must be dropped into the “stomach” & hands must not touch the water

Pond = beads/fish must be dropped into “stomach” & hands must not touch the water

Forest = rice must be picked off the bark/stump (not the table) & dropped into the “stomach”

Prairie = sunflower seeds must be cracked and the nut dropped into stomach

Emphasize to students this is not a competition; they are trying to find the habitat best suited to their beak. At the end of each rotation, either record the number of food pieces eaten at each station for each style beak on the dry erase board or on the students’ Habitat Record Sheets.

Using a bar graph or pie chart, ask students to figure out the top habitat choice for their “beak.” For younger students, use their total food numbers and make a graph/chart as a class.

Simulated Habitats
Marsh = container with shallow water and floating objects
Pond = container with deep water and beads/fish at the bottom
Forest = stump with holes and rice in the holes
Prairie = sunflower seeds in pie pan



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Bird Hike

(60 min)

Using photographs, discuss common bird species students might see during their hike. Explain to students how to use the observation data sheet to record their findings during their hike on the refuge. Designate different areas, or territories, for each group to observe birds and record their observations. To best compare and contrast species and their behaviors, ask groups to explore more than one habitat type (*ex: spend some time in/observing the prairie, not just the forest*).

Wrap-up Management Connection

(10 min)

Monitoring Birds

Lead the group through a discussion of the types of birds and bird behaviors they observed. Discuss the connection between the style of bird beaks they saw and the habitat they found the birds in. Ask students how these birds were adapted to live in the habitat in which they were found. Then discuss the information obtained and the techniques used to monitor birds

A main reason for the creation of the U.S. Fish and Wildlife Service in the early 1900's (1903) was to regulate the over hunting of birds for sport, fashion, and subsistence. By researching birds through field observation and banding, the U.S. Fish and Wildlife Service has monitored population counts, identified migration routes and food preferences for individual species, preserved high quality habitat, and more.



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Birds, Beaks and Adaptations
 Habitat Record Sheet

Directions: Have all students/groups record the number of food pieces eaten from each habitat with each tool.

		Habitats				
		Pond	Marsh	Forest	Prairie	Results
Beaks	Pliers					
	Short Tongs					
	Long Tongs					
	Tweezers					



Birds, Beaks, and Adaptations Rainy Day Hike Alternatives

Materials

- Birds Clever Catch Ball and question / answer card
- Clipboards (one per group)
- Pencils (one per group)
- Bird Feeder Survey data sheet (one per group)
- Easel with paper
- Markers

Bird Feeder Survey

(30 min)

Divide the class into 2-3 groups, depending on how many feeder stations are available in the Visitor Center. Explain that each group will observe birds and bird behavior at the feeders, and then record their findings on the data sheet. Pass out a clipboard, pencil, and data sheet to each group. Allow groups at least 15 minutes to observe and record.

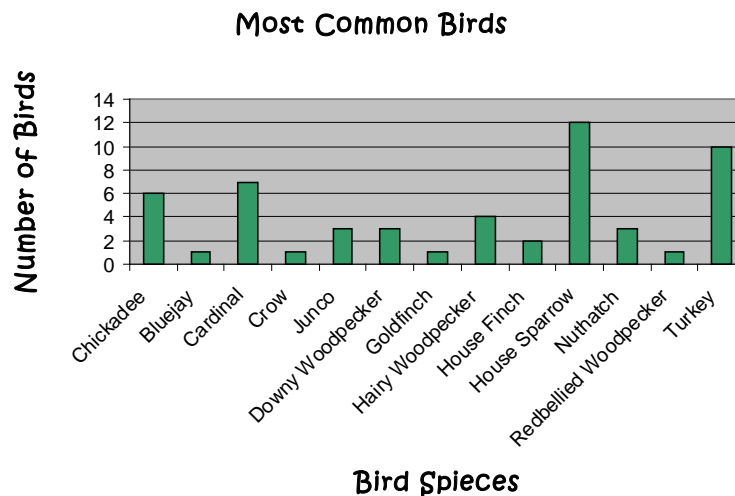
Bring students back to the classroom and ask them to tally the species they observed.

Students should:

- Count the number of different species,
- Record the highest number of visits by one species of bird, and
- Calculate the total number of birds observed.

Compile data from each group on the board. Work with students to organize and/or graph the findings to answer any of the following questions:

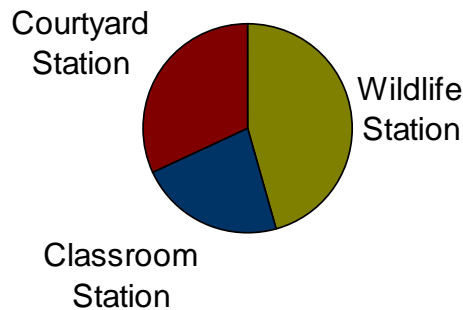
- What was the most common bird species to visit the feeder stations?



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- Which feeder station had the most number of birds? Which station had the smallest number?

Feeder Station Visitation



- Which feeder station had the most diverse species of birds? What could be done to increase diversity of birds visiting the other stations? (offer different food choices, set up more feeders, etc.)

Birds Clever Catch Ball

(30 min)

Use the same two groups from the pre-activity *Jeop-Birdy* or divide the class into two teams. Line up the teams facing each other in a large space of the visitor center or outside. Instruct the students, beginning at one end of the line, to toss the Birds Clever Catch Ball to the student directly opposite them. If the student can correctly answer the question closest to where his/her right thumb lands when they catch the ball, they collect 1 point for their team. If the student answers incorrectly, the group will not receive the points and the ball must be tossed to the next player in line on the opposite team. Keep track of each team's points. Play until all 36 questions have been answered or you run out of time. Remind students to listen carefully because questions might be repeated making it easier to gain points for their team. A questions and answers sheet is available at the refuge. Create a set of your own questions students may choose from, if you prefer not to let students repeat questions.

Flying WILD activity, Jeop-Birdy

(50 min)

Students learn interesting bird facts while testing their knowledge about bird biology, adaptations, and behaviors.

To begin, use either the Refuge's Wildlife Jeopardy board or a dry-erase board. Stick or write the categories at the top, with the point value listed beneath each category. Remove/erase each number as the question is chosen. Example for set up:



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Bye- Bye Birdie	Bird Words	Amazing Adaptations	Bird Brained	Save the Birds
100	100	100	100	100
200	200	200	200	200
300	300	300	300	300
400	400	400	400	400
500	500	500	500	500

Divide students into two teams. Ask each team to choose a team name (preferably a MN bird name), and a team captain who will speak/answer for the team. It is recommended that an adult keep tally of the points for each team.

Flip a coin to determine the team that will answer first. Explain to the students that the value of points selected reflects the level of difficulty of the question (higher points mean greater difficulty). With assistance from his/her teammates, the captain from the first team must choose a category and point value. The team should quietly confer and decide the team's answer together. After everyone has agreed, the **ONLY** team member that may answer the question is the team captain. If the team is correct, they receive the points. If the first team answers the question incorrectly, there is no penalty (no point loss); however, the second team will be given the opportunity to answer the same question. The second team may discuss the question as a group, but **ONLY** the team captain may answer after everyone in the group has agreed. If the second team answers incorrectly, neither team gains the points and the Jeop-birdy leader should share the correct answer with the students. Continue the game with the second team selecting the next question.

The game ends when all the point values have been chosen under each category, or class time is up. Remember to leave 5 minutes at the end for a wrap-up discussion.



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Jeop-Birdy Questions

	Bye-Bye Birdie	Bird Words	Amazing Adaptations	Bird Brained	Save the Birds
100	This is a word used to describe birds when they can no longer be found on earth.	This is another word for the mouth of a bird.	This feature found on a bird helps them fly, and is not shared with any other living animal.	This is the smallest bird in the world.	When you are hiking and come upon a bird's nest, this is something you should not do.
200	This bird is the United States symbol, and was almost driven to extinction by a pesticide called DDT.	The claws found on a bird of prey.	Baby birds develop in these.	The seasonal movement of birds from one place to another.	Birds often fly into these "invisible" structures, found everywhere from skyscrapers to your house.
300	This is an obstacle that can obstruct a bird's flight pattern.	The natural process of replacing old feathers with new ones.	Most owls use this to find food.	Male birds are brightly colored for this reason.	These are domestic predators (household pets) that kill hundreds of thousands of birds each year.
400	This is one of the major causes of extinction in the world.	Bird feathers and beaks are made out of this material.	The type of feather that keep birds warm during the winter.	One of the fastest birds in the world.	These are chemicals that have led to declines in the population of many bird species.
500	Only 100 years ago, flocks of 1,000's of these birds were common. Over-hunting drove them to extinction.	This is the name of a colony of herons.	What makes a bird skeleton different from other animal skeletons?	What is the one sense that vultures rely on that is not well developed in other birds?	The Act (Federal law) created by the U.S. Fish & Wildlife Service to protect birds and other wildlife populations.



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Jeop-Birdy Answers

	Bye-Bye Birdie	Bird Words	Amazing Adaptations	Bird Brained	Save the Birds
100	What is extinct?	What is the bill/beak?	What are feathers?	What is a hummingbird?	What is collecting, touching, or disturbing birds or the nests?
200	What is the Bald Eagle?	What are talons?	What are eggs?	What is migration?	What are windows?
300	What is - a radio/cell phone tower, an antenna, a building, an electrical wire, or a windmill.	What is molting?	What is sound or listening?	What is to attract a mate and/or protect its young?	What are cats?
400	What is habitat loss?	What is keratin?	What are downy feathers?	What is the Peregrine Falcon?	What are pesticides?
500	What is the Passenger Pigeon?	What is a rookery?	Hollow bones	Sense of smell	What is the Endangered Species Act?

