

It's All About Birds!

**Grade 7
Science**

I. Introduction to Birds

Birds are warm-blooded, have distinctive beaks, and their young hatch from hard-shelled eggs. A characteristic unique to birds is the presence of feathers. They provide insulation, enable flight, and are used in visual communication. Adaptations that enable flight include fused and lightweight hollow bones, and a keeled sternum (for the support of flight muscles). Variations in birds (e.g., coloration, wing shape, beak type) give clues to their habitat, feeding tendencies, and behavior.

- Feathers
- Warm Blooded
- Wings
- Beaks
- Hard-shelled Eggs
- Lightweight Hollow Bones

II. Form and Function

[Standard 2:2 – Specialized structures perform specific functions at all levels of complexity \(e.g., leaves on trees and wings on birds\)](#)

A bird's beak is made of bone and is part of its skull. It is covered by a moderately hard outer layer of keratin, the same material found in human fingernails. Like our nails, the tip and edges of the beak are re-grown as they wear away. Bird beaks are multi-purpose tools used in communication, grooming, nest construction, defense, offense, and to pick up, tear and/or catch food. Birds have adapted a variety of different beaks best suited to their feeding habits and behavior.

Activity: Bird Beaks

Objective: Students will observe different types of bird beaks and recognize that some beaks are better suited for particular foods.

Materials: [Bird Adaptations - Beaks handout](#)
 [Bird Beaks Recording Sheet handout](#)
 [Bird Beaks Class Data Grid handout](#)
 Graph paper
 Marbles
 Toothpicks

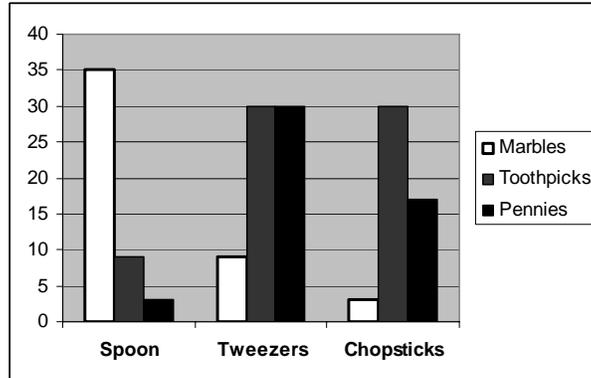
Pennies
Spoons
Tweezers
Chopsticks
Plastic cups
* Straws
* Fruit Juice
* Licorice strips or gummy worms
* M&Ms or gumballs
* Oyster crackers

Procedure:

- 1) Discuss with students how different beak shapes are better suited for different feeding habits.
- 2) Give each student a [Bird Beaks Recording Sheet](#) handout, plastic cup, and choice of beak.
- 3) While holding the 'beak' in one hand and 'stomach' (plastic cup) in the other hand, students pick up as many marbles ('food items') as they can in an allotted amount of time.

Note: 'Food items' can be placed on the floor in the midst of a circle of students, or on individual plates. To avoid extreme competition, tell students that they can not pick up or steal a food item that another student is attempting to pick up, or from another student's 'stomach'.

- 4) Announce when time is up (usually 1-2 minutes works well). Have students count and record data on the [Bird Beaks Recording Sheet](#) handout, the number of items that were in their 'stomach'.
- 5) Repeat steps 3 and 4 with pennies, then toothpicks.
- 6) Collect data from students and record on [Bird Beaks Class Data Grid](#) handout.
- 7) Have students make a bar graph, using information from the [Bird Beaks Class Data Grid](#) handout, which shows the totals for each beak and food type.



9) Distribute [Bird Adaptations - Beaks](#) handout. Have students study each type of beak and note how it is suited for a particular diet. Along with other characteristics such as color, size, and song/call, beak shape is used in classification keys to determine bird species.

* Fun additions: Replace toothpicks with strips of licorice or gummy worms, replace marbles with M&Ms or gumballs, replace pennies with oyster crackers, straw 'beak' and individual cups of fruit juice to simulate nectar feeders such as hummingbirds, etc.

Activity adapted from Science NetLinks lesson: Bird Beaks.

III. Classification

Process Standard 2:1 – Use observable properties to place an object, organism, and/or event into a classification system (e.g., dichotomous keys)

Birds are categorized into Order, Family, Genus, and Species using both physical and molecular characteristics.

Activity: Class Key

Objective: Students get a better understanding of how classification keys work by making their own key to distinguish classmates.

Materials: Pencils
Paper

Procedure:

- 1) Have students build a key of classmates using characteristics such as boys/girls, color of hair, length of hair, color of eyes, hometown, and does/doesn't have a dog, etc.

- 2) Ask the principal (or another teacher/adult) to come into the class and, using the key, locate one particular student.

* See sample [Class Key](#)

Activity: Classification of Common Birds

Objective: Students learn to categorize and classify common birds.

Materials: Pencils
Paper
Bird Field Guide or Pictures of Common Birds

Procedure:

- 1) Observe and identify common birds outside, at a feeder, or through pictures.
- 2) Have students construct a classification key to common “bird feeder” birds using characteristics such as: birds with a crest or no crest, presence or absence of red color on chest, type of beak (straight, conical, etc.), overall color of bird, relative size (smaller than fist, size of fist, size of forearm, larger than forearm), etc.

* See sample [Common Bird Key](#)

There are approximately 10,000 different species of birds in this world, and every single one of them plays an important role in the web of life. As well as their individual roles in the food web, birds are also important in determining overall health in an ecosystem.

IV. Biodiversity and Bio-indicators

An **ecosystem** refers to a group of living organisms interacting among themselves and with their environment. Whether predator or prey, birds are an integral part of our ecosystem. **Biodiversity** is the variety of life, and it includes several levels: living organisms (crows, cacti, coyotes, etc.), genetic variations among organisms (different colored roses, differences in body size among the same species), and different ecosystems (forest, prairie, wetland, coastal, etc.). Greater biodiversity in a system provides greater stability and resilience to both natural and human-caused disturbances.

Birds are found on every continent and in nearly every habitat. Their ability of flight demands a fast metabolism, which in turn leads to faster processing of environmental quality. Because birds show symptoms and indications of poor environmental health before many other animals, they are referred to as biological

indicators or bio-indicators. **Bio-indicators** are a group or class of organisms whose populations or status can be used to determine environmental health.

Because all things on earth are interconnected, losing one species can have a devastating effect on other species in an ecosystem, sometimes in ways that we wouldn't foresee. That's why preserving biodiversity is important to us all.

Activity: We're All Connected!

(This activity is also included in the Social Studies lesson plan)

Objective: To demonstrate to students how all things on earth are connected and the importance of biodiversity.

Materials: Ball of Yarn
Species Cards
Tape

Procedure:

- 1) Explain to students that they are each going to play a component in a forest ecosystem.
- 2) Assemble students in a circle and assign each a species of plant, animal, or non-living thing (see suggested list).

Note: If there is time, allow students to write and draw their component themselves.

- 3) Have students look around the circle at each other and think about how plants, animals, and non-living things are connected.
- 4) Have one student hold onto the end of the yarn and toss the ball to another student, explaining his/her ecological connection to the other student.

Example: The Red-shouldered Hawk is connected to the tree because the tree provides a structure for the bird's nest, as well as a perch from which the hawk can hunt animals on the ground below.

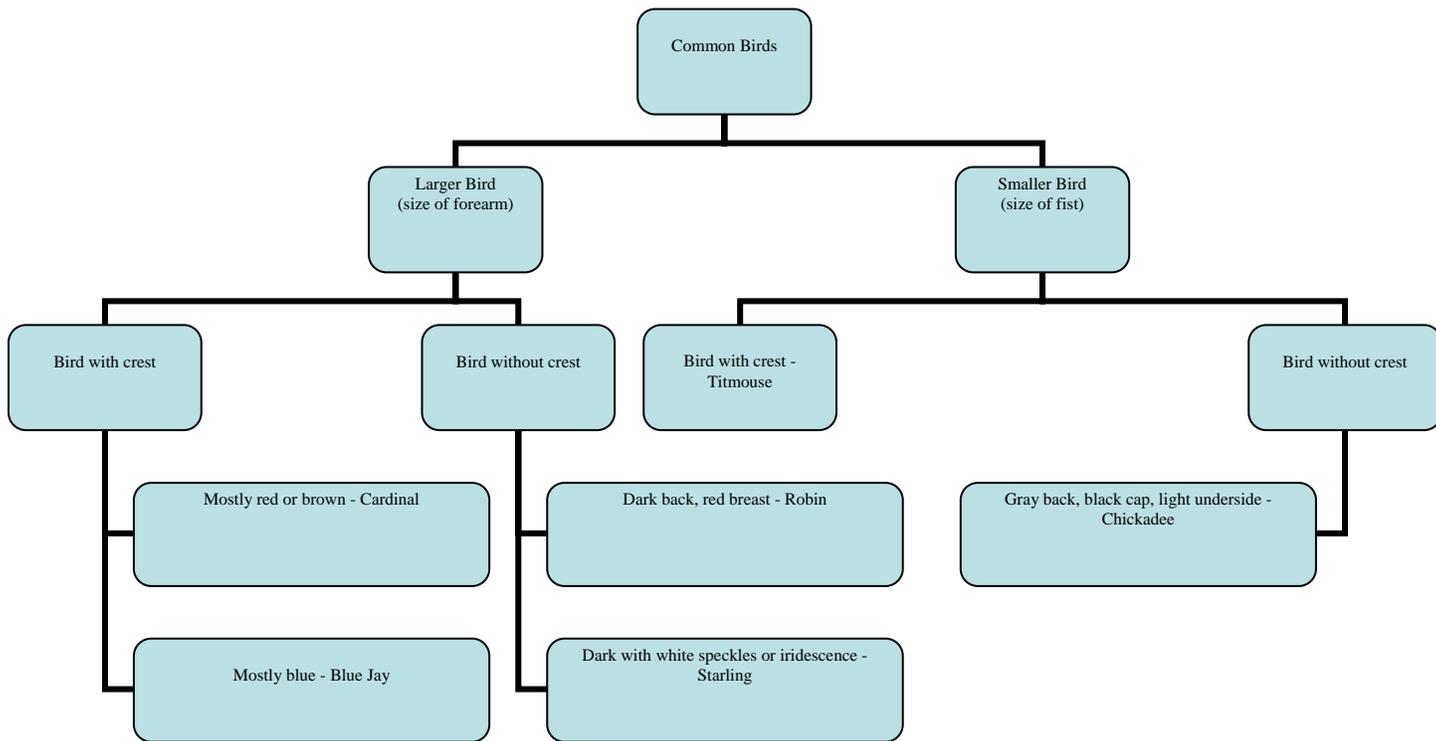
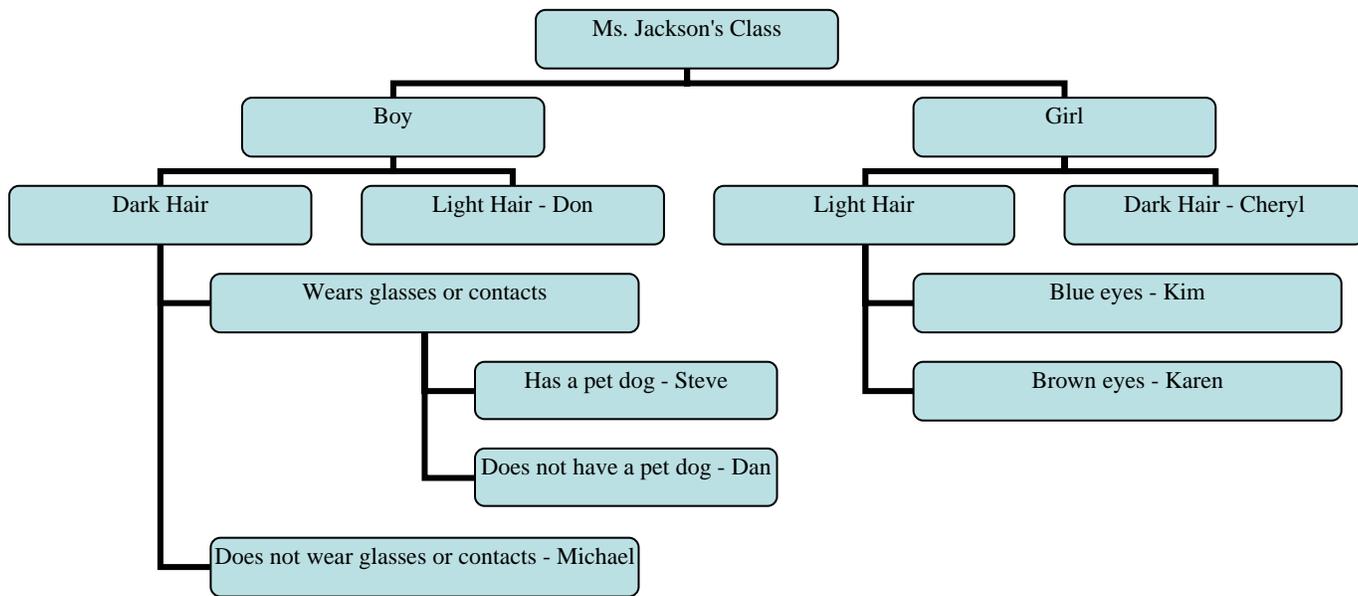
- 5) Have the second student toss the ball of yarn to another student and explain their connection. As each student makes a connection, wrap the yarn around the student's waist. A big complicated web will start to form.
- 6) When all students are connected in the web, explain that harming any part of the web affects many other parts. Have students imagine what would happen if the tree was cut down (the tree student can shake or tug on the yarn). What would happen if the bird died (have the bird fall to the ground)? Ask the other students if they can feel the changes in their yarn.

- 7) When the students have played for a while, ask them to stop and notice which components of the ecosystem have the most connections to others and why. Make note of components that would cause the most disturbance to the ecosystem.

Suggested Ecosystem Components

Sun	Red-shouldered Hawk
Tree	Water
Vulture	Mouse
Sparrow	Bat
Mosquito	Mushroom
Turtle	Millipede
Fish	Eagle
Ant	Woodpecker
Frog	Log
Coyote	Fox
Rabbit	Pigeon
Sunflower	Spider
Moth	Deer
Crow	Scorpion
Poison Ivy	Human

Sample Keys



Bird Adaptations - Beaks

Did you ever wonder why there are so many types of bird beaks (scientists call them bills)? The most important function of a bird bill is feeding, and it is shaped according to what a bird eats. If you want to learn more about birds, you may want to pay attention to bill shapes! You can use it as one of the characteristics you use to identify birds. If you have already identified a bird, you can learn more about its behavior by looking at the bill and thinking about what it eats. Then you may think about where it lives, and so on. To help you get started, here are some common bill shapes and the food that they are especially adapted to eat:

SHAPE	TYPE	ADAPTATION
	Cracker	Seed eaters like sparrows and cardinals have short, thick conical bills for cracking seed.
	Shredder	Birds of prey like hawks and owls have sharp, curved bills for tearing meat.
	Chisel	Woodpeckers have bills that are long and chisel-like for boring into wood to eat insects.
	Probe	Hummingbird bills are long and slender for probing flowers for nectar.
	Strainer	Some ducks have long, flat bills that strain small plants and animals from the water.
	Spear	Birds like herons and kingfishers have spear-like bills adapted for fishing.
	Tweezers	Insect eaters like warblers have thin, pointed bills.
	Swiss Army Knife	Crows have a multi-purpose bill that allows them to eat fruit, seeds, insects, fish, and other animals.

Bird Beaks

Recording Sheet

Name: _____

Date: _____

Individual Data Grid

	Marbles	Pennies	Toothpicks	Total Food Collected
Type of beak:				

Class Data Grid

	Marbles	Pennies	Toothpicks	Total Food Collected
Spoon				
Chopsticks				
Tweezers				

Adapted from Science NetLinks lesson: Bird Beaks

Bird Beaks

Class Data Grid

	Marbles	Pennies	Toothpicks	Total Food Collected
Spoon				
Chopsticks				
Tweezers				

Adapted from Science NetLinks lesson: Bird Beaks