

Banding Demonstration

Overview

Bird banding is an important tool ornithologist's (scientist who study birds) use to help track and monitor birds. Students will learn about this scientific approach and its importance

Objectives

Students will:

- Learn how bird banding is used as a tool to monitor and track birds
- Learn the difference between aluminum and color bands, and the importance of each
- Learn ways they can use color bands to help scientists

Background Information

Bird banding has been explored as a method to gain more information about birds for many years. There are 25 standard sizes of bands as well as 5 special sized bands to fit birds of many different sizes. These bands are made from aluminum and have a unique 8 or 9 digit code etched on it. This enables scientists to identify this band from any other in the system. Plastic color bands are also used to allow for banded birds to be re-sighted from a distance with greater ease. Bird banding helps scientists collect data about a variety of topics including information about migration patterns, habitat assessments, population studies, and life history.

Procedure

1. Scientist will have students gather in a circle to allow all participants access to observe a bird in the hand close up.
2. Scientist will discuss why and how we catch wild birds in the city and elsewhere. Hopefully there will be a bird in a "bag" ready to be used in the demonstration.
4. Bird will be gently taken from out of bag and held for all participants to see.
5. Bands will be described and explained before placing on the bird's leg. Depending on age group, bands can be passed around for closer observation.
6. Metal USGS bands will be placed on the bird (color bands also, if bird is focal species).
7. Measurements will be taken while participant is chosen to take "notes" like a scientist.
8. Bird will be released by a participant! Participants can be taken to see where and how nets are places to catch birds.

<u>Activity Time</u>	<u>Grades</u>
Flexible ~30 min	All
<u>Materials</u>	<u>NGSS Standards</u>
Banding kit	LS1-1
Mist nets(s)	K-ESS3-1
	2-LS4-1
	3-LS3-2
	3-LS4-2
	MS-LS1-4
	MS-LS4-2

What Makes a Bird a Bird?

Overview

Students will explore what characteristics make a bird different from all other creatures. They will learn about adaptations specific to birds and flight.

Objective

Students will:

- List characteristics of birds and compare to other non-avian species
- Observe and discuss characteristics through presentation of bio-facts
- Show diversity of characteristics among different bird species
- Connect characteristics to specific habitats

Background Information

Birds, like mammals, reptiles, fish, and amphibians are vertebrates. Birds are endothermic with a four chambered heart to regulate their body temperature just like mammals. One characteristic that truly sets birds apart from any other creature are feathers.

Procedure

1. In a group, the scientist will ask what comes to mind when you hear the word “bird”.
2. Make a list on the white board of all the characteristics of a bird.
3. Compare the characteristics of birds to that of other species. Discuss as you cross off characteristics that are not unique to ALL birds. The remaining characteristic should be feathers!
4. While discussing, bio-facts can be passed around (see list in green).
5. **Clarify** that feathers are the only characteristics specific to birds.

<u>Activity Time</u>	<u>Grades</u>
30 min	2 nd grade +
<u>Materials</u>	<u>NGSS Standards</u>
White board	K-LS1-1
Markers/Pencils	1-LS3-1
Feathers	2-LS4-1
Hand lenses	3-LS1-1
Worksheets	4-LS1-1
Other bio-facts	MS-LS4-2

BIRD CHARACTERISTICS

- ENDOTHERMIC: birds, like mammals, are endotherms. This means they internally control their body temperature despite the outside conditions. This allows birds to maintain a high energy and metabolism which is necessary for flight. In comparison, reptiles and amphibians are exothermic.
- EGGS: birds lay hard-shelled eggs as part of their reproductive cycle.
- BEAKS (bills): birds have beaks or bills which are specially adapted for their (foraging) niche.
- FEET: birds typically have four toes on each foot. Their feet are specially adapted depending on their habitat and prey.
- CROP: the crop stores food that will later be digested. It is located at the bottom of the esophagus. It allows the bird to eat quickly and then move somewhere safe to digest their food. This also allows them to carry food back to their young.
- GIZZARD: the gizzard is the muscular second part of bird's stomach. Because birds don't have teeth to chew with, the gizzard is important in role of grinding food. Birds will sometimes swallow grit or small stones to help with this process.
- HOLLOW BONES: most bones in a bird's body are hollow and filled with air sacs connected to the respiratory system. This aids in flight.
- FEATHERS: feathers are an adaptation which is truly unique to birds. Feathers are made of keratin, the same protein that makes up hair, scales, and claws. They are an important part of flight, insulation, and communication.

Migration Vacation

Overview

Students will learn about bird migration through analogies to human travel

Objectives

Students will:

- Compare and contrast bird migration and human travel
- Explore migratory flyways
- Discuss migratory adaptations

Background Information

More than 700 species of birds live in the United States. Some are resident species, meaning they live in the same habitat all year round. Other birds are migratory species, which means they must make the journey between their breeding and wintering homes. Birds that make these annual migrations must be prepared ahead of time. They load up on fat to provide them with the energy to make the journey, which can be thousands of miles long. Birds also must make sure their feathers are in great shape for the long flight, so they molt, replacing old feathers with new ones. Often times birds travel at night, using the stars to guide them. Scientists have discovered that birds have two organs inside of their skulls – the brain and a smaller organ containing high levels of iron, which allows the bird to align with the earth's magnetic fields. Essentially this unique organ acts as an internal compass.

Procedure

Nice outfit = breeding/winter plumage

The topic is molt.

Shampoo/Conditioner = uropygial oil

The topic is preening.

Map/Compass/GPS = star and magnetic navigation

The topic is navigation.

Snacks/gas stations = gaining fat before flight and stop over locations

The topic is fuel sources.

Toy car/plane/train = wings

The topic is flight.

What are some things that people can do to help migratory birds (protect stop over points, protect the environment, keep cats indoors, place decals on windows)?

Students can be given a worksheet to explain what they just learned.

Activity Time

20+ min

Grades

All

Materials

Flyway map

Option 1: white board for
list of vacation items

Option 2: backpack/luggage
with items (bottles of shampoo,
compass, rain coat, clothes,
snack items, toy car/train/plane

NGSS Standards

K-ESS3-1

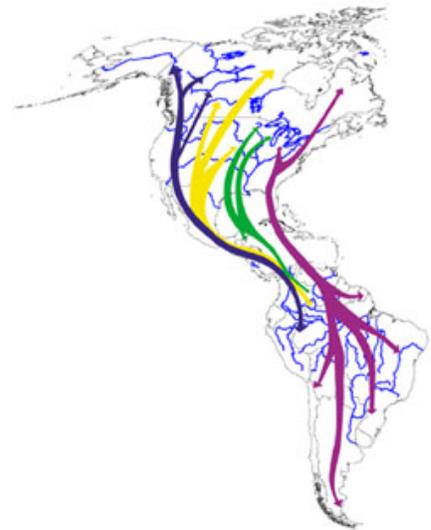
2-LS4-1

3-LS1-1

5-PS3-1

MS-LS2-2

MS-LS2-5



Adaptation Stations

Overview

All animals are equipped with adaptations to help them survive in their habitat. Students will learn about different bird adaptations through a variety of hands-on activities.

Objectives

Students will:

- Discover and define bird adaptations and their functions
- Learn about different body parts/structures of a bird
- Participate in interactive activities demonstrating how various adaptations allow birds to survive in different habitats
- Explore characteristic traits and species identification of native birds
- Gain experience using scientific equipment

<u>Activity Time</u>	<u>Grades</u>
Flexible 30 min +	K-6

<u>Materials</u>	<u>NGSS Standards</u>
“Beak” tools (tweezers, etc.)	LS1-1
Seeds	K-ESS3-1
Hollow/solid bone	1-LS1-2
Scale	1-LS3-1
Feet + bird photos	2-LS4-1
Down/contour feathers	3-LS3-1
Magnifying lens	3-LS4-2
Bird song player	3-LS4-3
Worksheets/pencils	MS-LS205

Background Information

With over 10,000 species of birds world-wide living in a diverse expanse of habitats, birds are equipped with a large diversity of adaptations that help them survive in their specific niche. These adaptations allow them to inhabit a variety of habitats, fly, find food, migrate, communicate, reproduce, and survive. Some are physical characteristics such as coloration, feathers, specialized beaks and feet, and a streamlined body shape. Some are behavioral characteristics including nest building, communication, migration, and different methods to find food. Together these characteristics are called adaptations. Adaptations are modifications, or changes, by which a species improves its condition in relation to its environment over generations.

Procedure

Students will become scientists and explore different bird adaptations. Stations will be set out in a circle as follows with a certain time allotted for each station:

1. **Beak Station:** Students will evaluate which tool functions the best for opening sunflower seeds. The tools mimic different types of beaks; straw for a hummingbird, old can opener for a hawk, pliers for a cardinal, and tweezers for a woodpecker.
2. **Bone Station:** Students will key out a bird bone by weighing and comparing the weight of a mammal bone and bird bone of similar size. Bird bones will be lighter because they are adapted for flight.
3. **Feet Station:** Students will match bird species with their appropriate feet. Birds include a raptor, woodpecker, song bird, and waterfowl.
4. **Feather Station:** Students will compare and contrast contour and down feathers using magnifying glasses.
5. **Vocalization Station:** Students will learn the importance of bird songs and calls. They will have an opportunity to listen to several examples and then create their own vocalizations.

Color Band Chaos

Overview

Bird banding is an important tool ornithologist's (scientist who study birds) use to help track and monitor birds. Students will learn about this method and how they can help spot banded birds.

Objectives

Students will:

- Learn how bird banding is used as a tool to monitor and track birds.
- Learn the difference between color band and aluminum bands, and the importance of each.
- Play an interactive game teaching them how to site bands.
- Learn ways they can use color bands to help scientists!

Background Information

Bird banding has been explored as a method to gain more information about birds for many years. The first record of a metal band being used to collect flight information is in 1595 when one of King Henry the IV's banded Peregrine falcon was lost, only to turn up 24 hours later over 1300 miles away! There are 25 standard sizes of bands as well as 5 special sized bands to fit birds of many different sizes. These bands are made from aluminum and have a unique 8 or 9 digit code etched on it. This enables scientists to identify this band from any other in the system.

Plastic color bands are also used to allow for banded birds to be spotted from a distance with greater ease. Bird banding helps scientists collect data about a variety of topics including information about migration patterns, habitat usage, population studies, and life history. Scientists who band birds report the data collected to a nationwide data base. This enables scientists to access information about birds they capture.

Procedure

1. The scientist will explain and show examples of both aluminum and plastic color bands used to identify birds.
2. If available, use photos or actual live banded bird to show how and where the bands are placed.
3. A volunteer(s) will be selected (4 per group of 20 students) to be "banded" with strips of paper. Once banded, they can jump, flap, and move to make it as difficult as possible for their classmates to ID their bands without outright hiding the bands. Tell the group that it is their job to figure out what the color combination is for each of the "birds".
4. Select two points (to simulate migration locations) and have banded bird fly between them without revealing their bands.
5. Students can try to properly identify the band combination (left from top to bottom, right from top to bottom).

Activity Time

Flexible 30 min +

Grades

K – 8th

Materials

Colored paper cut into strips

White paper cut into strips
(with 9 #'s)

Tape

Pictures of banded birds

NGSS Standards

1-LS1-1

2-LS4-1

3-LS4-4

MS-LS2-5

Who Are You?

Overview

Students will review the eight focal species of Urban Nestwatch using memory and problem solving skills.

Objectives

Students will:

- Identify the eight focal species
- Problem solve
- Be able to clearly describe focal species to other students

Background Information

Urban Nestwatch targets eight species of resident and migrant birds that are commonly found throughout the entire target area. The following lists the bird species along with brief background information.

AMERICAN ROBIN
CAROLINA CHICKADEE
CAROLINA WREN
GRAY CATBIRD
HOUSE WREN
NORTHERN CARDINAL
SONG SPARROW



I like to eat worms
I have a red breast.
I am in your backyard all year round!
I am monomorphic – females and males look the same.
My eggs are sky blue.

Procedure

1. Gather group and discuss what tools can be used to properly identify different species of birds.
2. Scientist will pass out “who am I” cards and the “Bird ID” cards.
3. Each student will have a card with one of the eight focal species and a list of clues. These cards will be hung on each participant’s back so that they cannot see their own species.
4. Students then to move and mingle through the group asking other students questions that will help them ID their species (i.e. “is my bird mostly gray?”)
5. Students may also read the clues from the card to help the identifier properly distinguish their bird.
6. After all of the students have successfully identified their species, have them group up and present what their species was and some information about their bird (such as the clues on the card). This can be done in one large group or smaller groups of eight, depending on the size of the group.

Activity Time

Flexible ~30 min

Grades

2nd +

Materials

Who Am I cards
Focal Spp. bird cards
Bird ID cards

NGSS Standards

2-LS4-1
3-LS4-3
4-LS1-1
MS-LS1-1

Collaborative Field Guide

Overview

Students will work together to create a collaborative field guide.

Objectives

Students will:

- Learn about the function of field guides
- Research local bird species
- Use observation skills to create a detailed bird sketch

Background Information

Field guides are a reference tool used to identify organisms or other items in the natural world. There are field guides for a variety of different subjects including plants, minerals, mammals, insects, and birds. Field guides typically include detailed descriptions and pictures or art to help the reader identify the subject in question. Field guides also include an index for the ease of the reader. More advanced guides will provide additional information such as taxonomy and range maps.

Procedure

1. Show students how different field guides and discuss how to use them - allow time to explore using field guides.
2. Explain how different distinguishing characteristics called field marks are used to help ID bird species and many field guides will have a diagram showing these.
3. Show students the diagram and go over basic characteristics such as crest, nape, eye stripe, eye ring, eye line, wing bar, crown, undertail coverts, back, breast, belly, etc.
4. Assign each student one bird, or let them choose off of a list - explain that they are going to be scientists and make a collaborative field guide. They are responsible for providing a factual and detailed description, drawing, and fact sheet about their species. They can use resources such as reference books, internet, and other field guides.
5. Pass out the "Field Guide Worksheet" and other materials.
6. Allow students time to research and fill out sheets - collect completed sheets and place in folder/binder or bind with cover sheet. Include bird description sheet and index (if desired).

Activity Time

Flexible 30 min +

Grades

3rd grade +

Materials

Field guides
Field guide worksheets
Colored pencils/crayons/
markers
Writing utensils
Binder/folder/cover sheet
References (encyclopedia, etc.)

NGSS Standards

LS1-1
MS-LS2-2

Bird species to include...

American goldfinch
Red-tailed hawk
Baltimore oriole
Chipping sparrow
American robin*
House finch
European starling
House sparrow
Song sparrow*
House wren*
Canada goose
Black-crowned night heron
Mallard
Red-bellied woodpecker
Downy woodpecker
Hairy woodpecker
American crow
Gray catbird*
Common grackle
Northern mockingbird*
Tufted titmouse
Carolina chickadee*
Blue jay
Northern cardinal*
Turkey vulture
Rock pigeon
Mourning dove
Ruby throated hummingbird
White-breasted nuthatch
Carolina wren*
Eastern phoebe

*Urban Nestwatch focal species

Exploratory Walk

Overview

Students will explore their surroundings to discover how close to nature they really are. This walk can be modified to focus on different subjects such as urban birds or habitats. Different materials such as scavenger hunt/bingo cards, binoculars, student journals, and field guides can be used to enhance the experience.

Objectives

Students will

- Participate in place based learning
- Use observation skills

Procedure

1. Introduction questions can be used to bring attention to the surroundings: has anyone ever explored it before? Has anyone seen bird here or at home before? What kinds of bird have they seen outside? What kind of habitat are they exploring today?
2. Students can be shown how to use binoculars (if available).
3. Students will be led on a walk through a nearby habitat – working in pairs they can search for different objects or behaviors around them. Silent gestures can be used to signal a finding without disturbing wildlife.
4. Use scavenger hunt checklist and/or habitat bingo sheets while walking.

K -2 Focus:

- Define the importance and components of a habitat: food, water, shelter, space
- Compare juvenile animals to adult animals/ saplings to trees to signify how younger organisms resemble grown organisms

3 -5 Focus:

- Highlight an example or two of plant and/ or animal adaptations: physical or behavioral (ex: thorns on plants, camouflage female cardinal, etc.)
- Compare juvenile animals to adult animals/ saplings to trees to signify how younger organisms resemble grown organisms
- Traits can be influenced by the environment (ex: drought, flood, warm winter)
- Discuss the importance of herds and flocks (ex: predator avoidance, searching for food, etc.)
- Share how different animals are adapted for different habitats (ex: duck in a pond)
- Introduce the food web (ex: plants- producers; consumers –omnivore, herbivore, carnivore (predator vs prey); decomposers.

<u>Activity Time</u>	<u>Grades</u>
Flexible	Any
<u>Materials</u>	<u>NGSS Standards</u>
Worksheets (habitat bingo, scavenger hunt)	LS1-1 ESS3-3
Student journal	1-LS3-1
Binoculars	2-LS4-1
Field guide	3-LS3-1
Bird ID cards	4-LS1-1
Writing utensils	5-LS2-1 MS-LS1-4

Bird Olympics

Overview

Students will learn about the wide variety of bird adaptations that enable birds to occupy different niches and habitats

Objectives

Students will:

- Define what an adaptation is
- Identify and describe the function of different bird adaptations in relation to habitat or niche
- Compare their abilities with birds

Background Information

Birds have developed a wide array of unique characteristics which allow them to inhabit a variety of habitats, fly, find food, migrate, communicate, reproduce, and survive. Some are physical characteristics such as coloration, feathers, specialized beaks and feet, and a streamlined body shape. Some are behavioral characteristics including nest building, communication, migration, and different methods to find food. Together these characteristics are called adaptations. Adaptations are modifications, or changes, by which a species improves its condition in relation to its environment over time (generations).

Procedure

1. Discuss how many different bird species are in the world, how different species of birds live in the same area, how many different species of birds can live in one place, and if anyone can explain what an adaptation is.
2. Play a game called *Bird Olympics* to see how we compare to bird to see how we compare to the special adaptations some of the Bird Olympic Champions including the American Kestrel, the Turkey Vulture, The Ruby-throated Hummingbird, the Northern Mockingbird, and the Barred Owl.
3. Hand out *Bird Olympic worksheet* - guide the students through each of the stations labeled with the station signs and bird cards - aid students at each station to complete task and fill out their *Bird Olympic worksheet*:
 - Station #1: A **Red-tailed Hawk** must use their sharp eyes to spot prey...I can stare for ___seconds without blinking.
 - Station #2: In 10 seconds, a **Ruby-throated Hummingbird** can flap its wings 500 times...in 10 seconds, I can flap my wings ___ times.
 - Station #3: A **Turkey Vulture** has a wingspan of approximately 1.72 meters or 68 inches...my wingspan is ___ meters.
 - Station #4: A **Northern Mockingbird** can learn up to 200 songs...I made it through ___ rounds.
 - Station #5: An **American Kestrel** can fly up to 65 miles per hour in pursuit of prey...I can run 20 yards in _____ seconds.

<u>Activity Time</u>	<u>Grades</u>
30 min	3 rd – 8 th
<u>Materials</u>	<u>NGSS Standards</u>
<i>Bird Olympics worksheet</i>	LS1-1
Station signs/bird cards	K-ESS3-1
Stop watch	2-LS4-1
Measuring tape	3-LS3-2
Pencils	3-LS4-2
Wing span banner	3-LS4-3
White board/dry marker	MS-LS1-4 Flat
area 25-30 yards long	MS-LS2-5