



## USU 4-H Bird Tote



### **BIG IDEA:**

Organisms have specific traits that help them survive.

### **UNDERSTANDINGS:**

Observing birds' form and function helps us understand how they fulfil their specific needs to survive in their habitat.

### **ESSENTIAL QUESTIONS:**

How do observations inform us about an organism's habits?

How does the shape and structure of birds' beaks and feet relate to how they function?

### **THREE DIMENSIONS, UTAH SCIENCE STANDARDS,**

### **AND INTENDED LEARNING OUTCOMES:**

See pg. 10-14

### **Supplies**

- Paper\*
- Pencils\*

### **Bird Beak Specialization p. 2**

- Various types of food\*
- Various "beaks"\* (clothespin, toothpick, straw, spoon, small plastic scoop, tweezers, small scissors, etc.)
- Paper Plates and Cups\*
- Bird Beak Specialization
  - Toucan
  - Osprey
  - Turkey
  - Barn Owl
  - Crow
  - Duck

### **Bird Walk p. 4**

- Binoculars
- Utah Bird Brochures
- Backyard Birds Field Guide
- Take a Backyard Bird Walk

### **Make a Bird Feeder p. 8**

- Knife\*
  - Paper punch\*
- Per bird feeder:
- Clean, empty milk\* carton (1 quart or half gallon is a good size)
  - 1 thin stick\* (8"-10" long)
  - Birdseed of choice\*
  - Funnel\*
  - String\*

\*Items not in tote



## Bird Beak Specialization

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### Activity 1: Bird Beak Specialization

Time: 30 min

Grade Level: 4-6

Materials:

- Paper and Pencil
- Various types of food (uncooked shell noodles, goldfish crackers, m&ms, gummy worms, sprinkles, nuts, raisins, etc.)
- Various “beaks” (clothespin, toothpick, straw, spoon, small plastic scoop, tweezers, small scissors, etc.)
- Paper Plates and Cups
- Poster Paper and Markers (optional)
- Bird Beak Specialization
  - Toucan
  - Osprey
  - Turkey
  - Barn Owl
  - Crow
  - Duck

### To Do:

1. Put the different types of food on plates, or in cups on a clean table or a clean mat on the floor.
2. Split the students into groups of about 4 students each. Give each student a “beak” utensil and cup to be their stomach.
3. Give the groups 10 seconds at each type of food to try to collect as much food as they can. Let students know they must keep one hand behind their back as they gather food with their utensil.

Extension: You may want to have students make predictions beforehand of what tools will be most effective to gather which food. Students can graph how much food they collected with each type of “beak” utensil. You may want to try putting the food in different containers, i.e. floating in water or at the bottom of a tall glass.

4. Ask students why they think birds have different types of beaks. Direct students to the idea that one reason birds’ beaks vary is because of their diets.
5. Let students examine the bird skulls and make inferences about what the birds eat. Have them write down their ideas on a paper or on a poster as a team.



## Birds of a Feather Continued

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6. Provide a list of what the birds really do eat. Have students match the bird skull to its correct diet.
- i. Toucan: “[T]he toucan's bill is useful as a feeding tool. The birds use them to reach fruit on branches that are too small to support their weight, and also to skin their pickings. In addition to fruit, Toco toucans eat insects and, sometimes, young birds, eggs, or lizards.”  
(<http://animals.nationalgeographic.com/animals/birds/toucan/>)
  - ii. Osprey: “The Osprey is the only hawk on the continent that eats almost exclusively live fish.”  
(<http://www.allaboutbirds.org/guide/osprey/lifehistory>)
  - iii. Turkey: “Wild turkeys typically forage on forest floors, but can also be found in grasslands and swamps. They feed on nuts, seeds, fruits, insects, and salamanders.”  
(<http://animals.nationalgeographic.com/animals/birds/wild-turkey/>)
  - iv. Barn Owl: “The Barn Owl's diet is dominated with mice, rats, voles, gophers, and shrews. In smaller amounts it will also take a vast array of other food including larger insects, reptiles, fish, and smaller birds.”  
([http://owling.com/Barn\\_nh.htm](http://owling.com/Barn_nh.htm))
  - v. Crow: “American Crows eat a vast array of foods, including grains, seeds, nuts, fruits, berries, and many kinds of small animals such as earthworms and mice. They eat many insects, including some crop pests, and also eat aquatic animals such as fish, young turtles, crayfish, mussels, and clams. A frequent nest predator, the American Crow eats the eggs and nestlings of many species including sparrows, robins, jays, terns, loons, and eiders. Also eats carrion and garbage.”  
([http://www.allaboutbirds.org/guide/american\\_crow/lifehistory](http://www.allaboutbirds.org/guide/american_crow/lifehistory))
  - vi. Duck: Ducks are omnivores and eat a wide variety of food. Some examples of what they eat are fish, frogs, algae, insects, and grass. Ducks also have special features on their beaks. “Along the edge of the beak there is a comb-like structure called a pecten. This strains the water squirting from the side of the beak and traps any food. The pecten is also used to preen feathers and to hold slippery food items.”  
(<http://en.wikipedia.org/wiki/Duck#Feeding>)
7. Have students think of their favorite food and design a bird beak and/or utensil specially made to eat that type of food. For many birds, their feet are also an important tool for catching or eating their food. Students may draw specialized feet to go with their beaks if they like.



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**REFLECT:**

- Which beaks worked to gather which types of foods best? What similarities do those foods have with food found in bird diets?
- Why do birds have different shaped beaks?
- Why are birds' diets so different one from another? How does it help a bird to have a very specialized diet? How does it help to be able to eat a variety of food.
- What did you observe about the birds beaks that surprised you?
- What observations or questions did you think of about the bird skull?

**APPLY:**

Birds' beaks are specialized to their specific diet. Different types of birds eat different types of food. If they were to all eat the same food there would not be enough. Some birds can eat a variety of things, depending on what is available. Other birds have very specific diets. Birds with certain diets are suited to certain environments.

Bird beaks and sometimes feet help us identify their diets. Their beaks are like a continuation of their skull. Because birds fly they have to be fairly light weight. Their skulls are lightweight and airy. Birds' skulls are usually large in relation to their body when compared with many mammals. While only mammals' bottom jaw can move, birds can move both their top and lower jaw.

**Activity 2: Bird Walk**

Time: 30 min. to 1 hr.

Grade Level: K-6

Materials:

- Paper and Pencil
- Binoculars
- Utah Bird Brochures
- Backyard Birds Field Guide
- Take a Backyard Bird Walk

**To Do:**

1. Decide on a place to go observe birds. Somewhere with lots of trees and plants is best. Many birds are more active in the morning. Consider going early or even going multiple times throughout the day to see if observations change throughout the day. You may want to set up a bird feeder to watch birds, particularly in the wintertime. Look for trees that retain their fruit in the wintertime, like the snow crabapple tree, where birds find food.
2. Discuss bird watching and using the bird guide books. Help students understand the necessity to be quiet so as to not scare the birds. Look through *Take a Backyard Bird Walk* to teach how to go bird watching and to find observation worksheets.
3. Give each student a paper and pencil and a set of binoculars. Distribute the *Utah Bird Brochures* and the *Backyard Birds Field Guide*. Consider showing some pictures of identified birds and have students practice finding them in their bird guide books.
4. Have students write down their observations and share them with the class or in groups. What do the birds eat? Is there a specific plant it likes to hang around? Did it interact with other birds? Etc.

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**REFLECT:**

- What would be different if you were bird watching 500 years ago?
- Did the time of day make a difference on what birds you saw? Why?
- Does watching for birds in a place where there are more plants make a difference? What do you think would change if you were to watch in a parking lot or an open field?
- Were you able to identify any of the birds you saw? What made it hard? What made it easier to identify the birds?
- Did you see any of the birds eating? Could you tell what they ate?

**APPLY:**

Bird watching has been around for a long, long time. They did not use to have all the tools we have now. Binoculars did not use to exist and were not especially good until fairly recently. Similarly, being able to get a good photograph of a bird was not always possible. Instead, people would draw pictures of the birds they observed. Bird guides were made with hand drawn pictures, not photographs. Scientists watch birds' behavior and record it to learn more and more about how birds live. Think about the skills you use to watch and identify birds. How could you apply those skills to other areas?



## Make a Bird Feeder

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### Activity 3: Make a Bird Feeder

Time: 30 min. to 1 hr.

Grade Level: 2-5

Materials:

- Knife (x-acto knife works well)
- Paper punch

Per bird feeder:

- Clean, empty milk carton (1 quart or half gallon is a good size)
- 1 thin stick (8"-10" long)
- Birdseed of choice
- Funnel
- String

#### To Do:

1. Cut 2 windows about 2-3 inches above the bottom of the carton on opposite sides of the carton. You may want to try making different shapes of windows on different bird feeders. You can try more holes, a bigger hole, narrow slits, or experiment with other ideas. Make two holes opposite each other just below the window using a hole punch. Make a hole at the top to be able to hang the bird feeder.

**Note:** Depending on the age of students, you may want to do these steps prior to the activity. You may choose to paint or cover the cartons if you would like.

2. Place the stick through the stick holes.
3. Students may want to design a roof or overhang to protect their bird feeder from rain or snow.
4. Let students decorate their bird feeder using markers, paint, glue, and odds and ends if desired.
5. Use a funnel to fill the carton with birdseed.
6. Tie a string through the hole at the top and hang the bottle on a tree or somewhere high where birds can feel safe.
7. Wait for birds to find your bird feeder. It may take a few days for them to find it and feel safe feeding from it.

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#### REFLECT:

- What type of feeding window did you make in your bird feeder? Do you think another type of window might work better?



## Make a Bird Feeder Continued

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- Is there a certain type of bird that mainly comes to your bird feeder? How many types of birds have you seen? Do they visit at a particular time of day?
- Did you use the same type of bird seed every time? What might happen if you change the type of seed that you use?
- Are there other bird feeder designs you would like to try?

### **APPLY:**

There are many different types of bird feeders. Some of them are suited better for certain types of birds, some are made to keep squirrels or water out, and others are built to look especially beautiful. People experiment with what types of birdseed and bird feeders work best to attract the types of birds they want to see. They will even put out lots of different types of feeders in their yard to attract as many types of birds as possible.



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## Additional Activities

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### Additional Activities

- Clever Catch Bird Game
- Birds of North America Card Game
- *Smithsonian Bird Watcher*—has lots of bird watching activities
- *Rachel: The Story of Rachel Carson*
- Make a bird hat—birds use their plumage to intimidate predators and attracting a mate
- Birds of a Feather—complete instructions in kit

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## Contents of Bird Tote

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- Bird Beak Specialization (Skulls)
  - Toucan
  - Osprey
  - Turkey
  - Barn Owl
  - Crow
  - Duck
- Binoculars (one without cover) (17) and Lens Clothes (21)
- Utah Bird Brochures (6)
- Backyard Birds Field Guide (22)
- Take a Backyard Bird walk
- Birds of a Feather
  - 9 types of feathers in different bags
    - Ringneck Plumage
    - Half White Duck Pointer
    - Down Feathers
    - Silver Pheasant Tail Feathers
    - Guinea Rooster Round Feather
    - Grey Goose Pointer
    - Bronze Barred Turkey Quill
    - Lady Amherst Red Top Feather
    - Ringneck Pheasant Tail Feather
  - Instructor handbook
- Bird Clever Catch Game
- *Rachel: The Story of Rachel Carson*
- *Smithsonian Bird Watcher*
- Birds of North America Card Game (2)



## Three Dimensions, Utah Science Standards, and Intended Learning Outcomes

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**Note:** These applications of National and State Science Standards are not comprehensive. They are meant to serve as suggestions. While only standards for elementary levels have been listed, standards for more advanced grade levels can also be applied. Additionally, this tote is an excellent tool to facilitate inquiry for any age group.

### THREE DIMENSIONS

#### **K-LS1-1. Interdependent Relationships in Ecosystems: Animals, Plants, and their Environment** (Activity 1: Bird Beak Specialization, Activity 2: Bird Walk)

**Use observations to describe patterns of what plants and animals (including humans) need to survive.**

##### **Science and Engineering Practices:**

- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.
- Scientists look for patterns and order when making observations about the world.

##### **Disciplinary Core Ideas:**

- All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.

##### **Crosscutting Concepts:**

- Patterns in the natural and human designed world can be observed and used as evidence.

#### **K-ESS3-1. Interdependent Relationships in Ecosystems: Animals, Plants, and their Environment** (Activity 1: Bird Beak Specialization, Activity 2: Bird Walk)

**Use a model to represent the relationship between the needs of different plants and animals (including Humans) and the places they live.**

##### **Science and Engineering Practices:**

- Use a model to represent relationships in the natural world.

##### **Disciplinary Core Ideas:**

- Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.

##### **Crosscutting Concepts:**

- Systems in the natural and designed world have parts that work together.

#### **K-ESS2-2 Interdependent Relationships in Ecosystems: Animals, Plants, and their Environment**



(Activity 1: Bird Beak Specialization, Activity 2: Bird Walk, Activity 3: Make a Bird Feeder)

**Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.**

**Science and Engineering Practices:**

- Construct an argument with evidence to support a claim.

**Disciplinary Core Ideas:**

- Plants and animals can change their environment.

**Crosscutting Concepts:**

- Systems in the natural and designed world have parts that work together.

**1-LS1-1 Structure, Function, and Information Processing** (Activity 1: Bird Beak Specialization,)

**Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.**

**Science and Engineering Practices:**

- Use materials to design a device that solves a specific problem or a solution to a specific problem.

**Disciplinary Core Ideas:**

- All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.
- Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs.

**Crosscutting Concepts:**

- The shape and stability of structures of natural and designed objects are related to their function(s).
- Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world.

**1-LS1-2 Structure, Function, and Information Processing** (Activity 1: Bird Beak Specialization,)

**Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.**

**Science and Engineering Practices:**

- Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world.
- Scientists look for patterns and order when making observations about the world.

**Disciplinary Core Ideas:**



- Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive.

**Crosscutting Concepts:**

- Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

**1-LS3-1 Structure, Function, and Information Processing** (Activity 1: Bird Beak Specialization)

**Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.**

**Science and Engineering Practices:**

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.

**Disciplinary Core Ideas:**

- Young animals are very much, but not exactly like, their parents. Plants also are very much, but not exactly, like their parents.
- Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.

**Crosscutting Concepts:**

- Patterns in the natural and human designed world can be observed, use to describe phenomena, and used as evidence.

**2-LS4-1 Interdependent Relationships in Ecosystems** (Activity 1: Bird Beak Specialization, Activity 2: Bird Walk, Activity 3: Make a Bird Feeder)

**Make observations of plants and animals to compare the diversity of life in different habitats.**

**Science and Engineering Practices:**

- Make observations (firsthand or from media) to collect data which can be used to make comparisons.
- Scientists look for patterns and order when making observations about the world.

**Disciplinary Core Ideas:**

- There are many different kinds of living things in any area, and they exist in different places on land and in water.

**3-LS4-3 Interdependent Relationships in Ecosystems: Environmental Impacts on Organisms** (Activity 1: Bird Beak Specialization)

**Construct and argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.**

**Science and Engineering Practices:**

- Construct and argument with evidence.

**Disciplinary Core Ideas:**

- For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.

**Crosscutting Concepts:**

- Cause and effect relationships are routinely identified and used to explain change.

**3-LS4-2 Inheritance and Variation of Traits: Life Cycles and Traits** (Activity 1: Bird Beak Specialization)

**Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.**

**Science and Engineering Practices:**

- Use evidence (e.g., observations, patterns) to construct an explanation.

**Disciplinary Core Ideas:**

- Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.

**Crosscutting Concepts:**

- Cause and effect relationships are routinely identified and used to explain change.

**4-LS1-1 Structure, Function, and Information Processing** (Activity 1: Bird Beak Specialization)

**Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.**

**Science and Engineering Practices:**

- Construct an argument with evidence, data, and/or a model.

**Disciplinary Core Ideas:**

- Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.

**Crosscutting Concepts:**

- A system can be described in terms of its components and their interactions.

**UTAH SCIENCE STANDARDS****K-Grade 2****Standard 1** (Activity 1: Bird Beak Specialization, Activity 2: Bird Walk):

- The Processes of Science, Communication of Science, and the Nature of Science. Students will be able to apply scientific processes, communicate scientific ideas effectively, and understand the nature of science.

**Standard 4** (Activity 1: Bird Beak Specialization, Activity 2: Bird Walk, Activity 3: Birds of a Feather):



- Life Science. Students will gain an understanding of Life Science through the study of changes in organisms over time and the nature of living things.

### Grade 3

**Standard 2** (Activity 1: Bird Beak Specialization, Activity 2: Bird Walk, Activity 3: Make a Bird Feeder):

- Students will understand that organisms depend on living and nonliving things within their environment.

### Grade 4

**Standard 5** (Activity 2: Bird Walk):

- Students will understand the physical characteristics of Utah’s wetlands, forests, and deserts and identify common organisms for each environment.

### Grade 5

**Standard 5** (Activity 1: Bird Beak Specialization):

- Students will understand that traits are passed from the parent organisms to their offspring, and that sometimes the offspring may possess variations of these traits that may help or hinder survival in a given environment.

### INTENDED LEARNING OUTCOMES (ILO’S):

1. Use science process and thinking skills.
2. Manifest science interests and attitudes.
3. Understand important science concepts and principles.
4. Communicate effectively using science language and reasoning.
5. Demonstrate awareness of the social and historical aspects of science.
6. Understand the nature of science.