Bird Breakfast Cafe

Grade: 1, 2, 3, 4
Length: 20-30 minutes
Big Ideas: Adaptations
Topic: Foraging skills on birds

Summary:
Students will understand that birds' beaks are adapted for the food they eat and the habitat they live in. Through this activity they will match a food item to a beak tool that they feel will best work with that food item. They will then match that beak tool to the picture of the bird they think has that kind of beak.

Standards:

Kindergarten Strand 2 – Living Things and Their Surroundings
Living things (plants and animals, including humans) depend on their surroundings to get what they need, including food, water, shelter, and a favorable temperature. The characteristics of surroundings influence where living things are naturally found. Plants and animals affect and respond to their surroundings.

Standard K.2.2
Obtain, evaluate, and communicate information about patterns in the relationships between the needs of different living things (plants and animals, including humans) and the places they live. Emphasize that living things need water, air, and resources and that they live in places that have the things they need. Examples could include investigating plants grown in various locations and comparing the results or comparing animals with the places they live. (LS2.B, ESS3.A)

First Grade Strand 2 – The Needs of Living Things and Their Offspring
Living things (plants and animals, including humans) depend on their surroundings to get what they need, including food, water, shelter, and a favorable temperature. Plants and animals have external features that allow them to survive in a variety of environments. Young plants and animals are similar but not exactly like their parents. In many kinds of animals, parents and offspring engage in behaviors that help the offspring to survive.

Standard 1.2.2
Construct an explanation by observing patterns of external features of living things that survive in different locations. Emphasize how plants and nonhuman animals, found in specific surroundings, share similar physical characteristics. Examples could include that plants living in dry areas are more likely to have thick outer coatings that hold in water, animals living in cold locations have longer and thicker fur, or most desert animals are awake at night. (LS1.A, LS1.D)

Second Grade Strand 2 – Living Things and Their Habitats
Living things (plants and animals, including humans) need water, air, and resources from the land to survive and live in habitats that provide these necessities. The physical characteristics of

plants and animals reflect the habitat in which they live. Animals also have modified behaviors that help them survive, grow, and meet their needs. Humans sometimes mimic plant and animal adaptations to survive in their environment.

Standard 2.2.2
Plan and carry out an investigation of the structure and function of plant and animal parts in different habitats. Emphasize how different plants and animals have different structures to survive in their habitat. Examples could include the shallow roots of a cactus in the desert or the seasonal changes in the fur coat of a wolf. (LS1.A, LS4.A, LS4.D)

Third Grade Strand 2 – Effects of Traits on Survival
Organisms (plants and animals, including humans) have unique and diverse life cycles, but they all follow a pattern of birth, growth, reproduction, and death. Different organisms vary in how they look and function because they have different inherited traits. An organism's traits are inherited from its parents and can be influenced by the environment. Variations in traits between individuals in a population may provide advantages in surviving and reproducing in particular environments. When the environment changes, some organisms have traits that allow them to survive, some move to new locations, and some do not survive. Humans can design solutions to reduce the impact of environmental changes on organisms.

Standard 3.2.5
Engage in argument from evidence that in a particular habitat (system) some organisms can survive well, some survive less well, and some cannot survive at all. Emphasize that organisms and habitats form systems in which the parts depend upon each other. Examples of evidence could include needs and characteristics of the organisms and habitats involved such as cacti growing in dry, sandy soil but not surviving in wet, saturated soil. (LS4.C)

Fourth Grade Strand 1 – Organisms Functioning In Their Environment
Through the study of organisms, inferences can be made about environments both past and present. Plants and animals have both internal and external structures that serve various functions for growth, survival, behavior, and reproduction. Animals use different sense receptors specialized for particular kinds of information to understand and respond to their environment. Some kinds of plants and animals that once lived on Earth can no longer be found. However, fossils from these organisms provide evidence about the types of organisms that lived long ago and the nature of their environments. Additionally, the presence and location of certain fossil types indicate changes that have occurred in environments over time.

Standard 4.1.1
Construct an explanation from evidence that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. Emphasize how structures support an organism's survival in its environment and how internal and external structures of plants and animals vary within the same and across multiple Utah environments. Examples of structures could include thorns on a stem to prevent predation or gills on a fish to allow it to breathe underwater. (LS1.A)

Essential Questions:
- How do an animal's adaptations help them survive?

- How does their habitat effect how an animal lives?
- What similarities and differences do we see within different bird species and how they obtain their food?

Enduring Understandings:

- Adaptations are specialized to help animals find food in their specific environments.
- Specific adaptations help accomplish different objectives.

Objectives:
Students will…

- Identify 5 different beak types.
- Match 5 different beak types to the type of food the bird would eat.
- Connect each diet to a bird species based on their beak shape and how it helps them obtain their food.
- Identify which habitat goes with each species and diet and how this relates to beak adaptations.

Materials:

- Beak tools (tweezers, pliers, tongs, chopsticks, small strainer)
- Bird Breakfast Café menu (list of the kinds of foods the birds will find to eat in each container) (Provided)
- Food containers (*see additional resources below for suggestions for alternatives*)
  - Log with uncooked rice in cracks,
  - container filled with mud and plastic frogs/worms,
  - bowl with water and "duckweed" or something to resemble small vegetation (I.e. grass or lettuce chopped into small pieces),
  - bowl with bird seed/nuts (sunflower seeds or unshelled peanuts work best for this),
  - bowl of water with plastic fish
- Images of birds (cormorant, grosbeak, duck, woodpecker, ibis) (provided)
- Images of adaptations up close (cormorant, grosbeak, duck, woodpecker, ibis) (Provided)

Background Information:
Birds have a wide variety of diets such as plants, insects, small to medium mammals, small reptiles, fish, and even other birds! Insects are one of the most important animal food for many North American birds. Since birds have high body temperatures and high rates of metabolism (rate of burning up their food to produce energy), they eat more food ounce for ounce, in proportion to their weight, than do most other vertebrate animals. Birds usually digest their food very rapidly and some small birds such as chickadees eat almost constantly.

Depending on the habitat there can be dozens of bird species sharing one area, sometimes even the same single tree. Feeding and foraging adaptations are essential if all species are going to live in harmony and not spend all their time out-competing each other. In a famous study, Robert MacArthur found that 5 species of warbler (essentially filling the same niche and surviving in the same kind of habitat) were able to co-exist by having adapted different foraging

habits, nesting habits, and having a slightly altered diet to the other birds sharing their space (MacArthur, 1958).

Key Vocabulary:

- Adaptation: something that helps an animal live in its environment/home.
- Diet: what food an organism/animal eats.
- Habitat: where an organism/animal lives, or its "home".

Procedure:

1. (*3 minutes)* Set up bird pictures, meals, and tools on a table in front of the classroom. Do not place pictures and tools near their correct meals. Save the close up images of the beak adaptations to show at the end of each stage below.
2. (*3 minutes*) Before you begin the activity, have students line up at the front of the class and walk past the table so they can get a close look at all the pictures, tools, and menu items.
3. (*2 minutes*) Ask some goofy, introductory questions: would you feed an owl a cookie? Or a duck a slice of pizza? Would a small chickadee be able to eat a steak? Explain that birds' beaks give us clues to the kinds of things they eat. Show students the menu and tell them you need their help in figuring out what each bird eats.
4. (*15-20 minutes*) Tell them that since birds don't have forks and knives, they use their beaks as tools to help them get a meal. Read the menu out loud with the students, then select one of the meals. Ask a volunteer to come up and look at the pictures of birds and the beak styles and have them match a bird and a beak to the selected meal.
    a. Worms and frogs in mud: Ask what kind of beak/tool a bird would need to get worms out of the mud. Offer the student 2-3 choices from the line-up of tools (make sure to include the chopsticks) and ask them to point to which they think would work best. Ask them why they chose the tool they did. If they don't choose the chopsticks hypothesize with the class why the tool chosen might not work the best (i.e. if the spoon is chosen go over how it would collect too much mud along with the food. Or if the tweezers are chosen explain that the whole tool gets muddy just to get deep enough to get their food). If the chopsticks are chosen, explain how they nicely and easily pick out worms and frogs from the mud without collecting too much mud in the beak and without getting the whole beak dirty! Ask a volunteer to sit down and then demonstrate for the whole class how the chopsticks work well. If time allows, also demonstrate how some of the other tools might not work as well. Ask the students which of the birds they think has a beak like chopsticks. The White-faced ibis has a long skinny beak for probing down in the mud and getting things deep in the mud without getting their face or eyes dirty. Show them the close up image of the ibis beak.
    b. Seeds: Explain that birds crack open seeds and nuts to get to the good stuff on the inside much like we would crack open a sunflower seed shell to get the seed inside. The seed is where the best nutrition can be found. Ask another volunteer to come up and present them with the bowl of seeds. Give them a few beak tools to choose from (make sure the pliers are an option). Go over how some of the other tools might not work well for cracking seeds (i.e. the

tongs aren't short enough or shaped properly for seeds or the tweezers are too small and aren't strong enough). Explain to students how the pliers are short, stubby, and strong-perfect for cracking seeds. Have the volunteer sit down and demonstrate cracking seeds with the pliers. Ask the class which bird has a beak like pliers. The Black-headed grosbeak has a short, stubby, strong beak that is perfect for cracking open lots of seeds. Show them the close up image of the grosbeak beak.

c. Duck weed: Repeat the procedure from above for the bowl of water and vegetation. Make sure that the strainer is one of the choices you offer your volunteer. Explain how the strainer drains out the water while leaving all of the good stuff (the vegetation) behind. You can explain how tweezers or pliers might also pick "duck weed" out and leave the water behind but they won't get as much all at once like the strainer does. Ask the class which bird has a beak like a strainer. The duck has a beak like a strainer. They have comb-like features on their beak that allows them to dabble through the water and sift out the nutritious vegetation. Show them the close up image of the duck bill.
d. Fish in Deep Water: Repeat the Procedure from above for the bowl of water with toy fish in it. Make sure the tongs are an option from the selection of tools you offer. Explain how some fish have to dive in the water or plunge their faces into the water to catch fish. Which beak would be best for watching fish? The tongs are sturdy and good at grabbing things that might be slippery or wriggly like a fish. Go over how some tools like the tweezers might be too small to catch a fish and the chopsticks wouldn't be able to hold onto the slippery fish. Demonstrate how the tongs grab the fish really well and ask the class which bird has a beak like the tongs. A cormorant's beak is long, strong and perfect for grabbing fish tightly as they dive for them in the water. Show the students the close up image of the cormorant bill.
e. Insects inside the bark of a tree: Most insects that birds find in trees aren't on the surface. They are under the bark and in crevices. Repeat the procedure from above. Make sure the tweezers are one of the choices. Birds that eat insects from trees need to fit their beak into small cracks and crevice and underneath the bark. What beak might be good for this? Tweezers are sturdy enough to burrow into bark and small enough to get tiny insects out of small spaces. Talk about how other beaks might not work as well such as the pliers which aren't small enough to get insects or the chopsticks that can't hold onto the insects well or aren't as sturdy for borrowing into tree bark. Demonstrate how well the tweezers pick up rice (the insects) out of the tree bark. Which bird might match this kind of beak? Woodpeckers have pointy, sturdy beaks that they hammer into tree bark and are perfect for picking insects out of crevices. Show them the close up image of the woodpecker bill.

(2-5 minutes) Congratulate students on successfully feeding all of their birds. Which ones were their favorites? Have students fill out the matching activity worksheet provided below to assess how well they understood the activity.

Additional Activity/Extension/Resources:

This activity calls for a lot of tools. Feel free to improvise as long as the tool/material closely mimics the bird beak or food source that is being demonstrated. In addition to the 5 tools representing specific bird beaks, you can also bring in a handful of other household or kitchen items to represent other beaks to

mix things up. Things like a spoon or ladle, straws, a butter knife or fork, etc. to make it a little more exploratory or challenging for the students.

Some suggestions for alternate materials:

Mud: while fun, real mud is messy. If you want to have a less messy alternative try using dry, uncooked oats. They still mimic the cover that mud would provide for worms and frogs.

Worms: If you aren't able to obtain fake worms, you could use rubber bands and take out the "frogs" part.

Fish: You could use rubber erasers or other things shaped like small fish that will sink into the bowl of water.

Bark: If you are unable to obtain the bark of a tree, you can use crumpled or bunched up brown paper to look like bark. Sprinkle some of the dry rice into the cracks and folds created by the crumpled paper and it should still have the same effect.

Bird images are in the following order below: Double-crested cormorant, Black-headed grosbeak, Mallard, White-faced ibis, Hairy woodpecker

Bird Beak close-ups are in the following order below: Double-crested cormorant, Black-headed grosbeak, Mallard, White-faced ibis, Hairy woodpecker

Citation: MacArthur, Robert H (October, 1958). "Population ecology of some warblers of northwestern coniferous forests". *Ecology* 39(4), 599-619