The Culture of Cranes

As a project, have students research the White-naped crane (Grus vipio) , learn about the challenges of breeding them in captivity and what is being done around the world to save their species. Activities include mapping their habitat and creating a hand feeding puppet.

By following this teacher's guide, students will learn about the vulnerable White-naped crane and the culture behind this unique bird.

Students will use the process of science inquiry, observation skills and knowledge of the basic concepts and principles of life science to complete this task.

North Dakota Science Standards: *2.2.2, 2.4.2, 3.2.2, 3.2.3, 3.4.3, 4.2.2, 4.4.2., 4.4.4, 5.2.1-2, 5.4.3., 5.1.1, 5.1.2, 5.1.3, 6.1.1, 6.2.1, 6.2.2, 6.2.4-5, 7.1.4, 7.4.6, 7.2.1, 9-10.1.2, 9-10.2.1, 9-10.2.3-8*

Introduction

White-naped cranes are the fourth rarest type of crane. **Habitat degradation** including destruction of wetlands due to agricultural expansion in the breeding range, as well as hunting, poses the most significant threats. Introduce the cranes to your students by discussing some general characteristics of the White-naped crane. You may provide or have your students research general information about the White-naped crane.

Words in bold are defined in the glossary in the appendix.

Background Information

Begin by choosing a student who is close to 6 feet tall and have him/her stand up. ***Ask: Did you know that the White-naped crane is very tall and can measure 4 to 6 feet?***

Now ask how much you think the crane weighs. Believe it or not, they only weigh between 10 and 15 pounds!

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Some of its **adaptations** include feathers that cover its body which are slate gray and white feathers on its head and along its neck. Wings have both gray and white feathers. This crane is identifiable by the large circle of bare, red skin around eye each and its pinkish legs.

Nape refers to the back of the neck, and is the origin for this species' name.

Ask: Have you ever seen a crane in the wild? Perhaps a bird resembling a crane? (Students might come up with a heron, an egret, etc). ***Where do you think cranes are from? In what kind of habitat do you think they live?*** Distribute the *world map* provided in the appendix and depending on the age level of your students, review the different continents.

The White-naped crane lives in wetland edges adjacent to grasslands located in the Amur river basin of southeastern Russia and northeastern China and Mongolia. It can also be found in Korea and southern Japan during the winter months. They breed in shallow wetlands and wet meadows in broad river valleys or along lake edges and **forage** in adjacent grasslands or farmlands. These cranes are excellent diggers.

Ask your students to use three different colors to indicate the breeding, migration and nesting grounds of the cranes. You can refer to the map provided by the International Crane Foundation: http://www.savingcranes.org/maps-on-white-naped-crane.html for each of the grounds.

Ask: Now that you know where the cranes live, what do you think their diet consists of? Which animals and insects live in or rely upon wetlands for survival? The White-naped crane is an omnivore; it eats vegetation as well as insects, small mammals, amphibians, and eggs. You may wish to elaborate on wetlands.

The population of White-naped cranes is estimated between 4,900 and 5,500, and it is a **vulnerable** species.

The International Union for the Conservation of Nature (IUCN) uses these terms to categorize the **conservation status** of a species:

Extinct *– No reasonable doubt that the last individual has died.*

Extinct in the wild*— Known only to survive in captivity or in an introduced population well outside the natural range.*

Critically endangered*— Facing an extremely high risk of extinction in the wild.*

Endangered*— Facing a very high risk of extinction in the wild*

Vulnerable*— Facing a high risk of extinction in the wild.*

Near threatened*— Does not qualify for one of the other categories now, but is likely to qualify for one of them in the future.*

Least concern*— Currently widespread or abundant.*

Ask: What do you think some of the major threats are to this bird?

Habitat loss and degradation are critical problems throughout the range of the White-naped Crane. Destruction of wetlands due to agricultural expansion in the breeding range poses the most significant threat. Critical habitat is also threatened by a proposed series of dams in the Amur River basin and the Three Gorges Dam in China.

Ask: What is being done to help these cranes?

The **Species Survival Plan (SSP)** is a program developed in 1981 by the American Association of Zoos and Aquariums (AZA) to help ensure the survival of selected species in zoo and aquariums, most of which are threatened or endangered in the

wild. The Red River Zoo participates in the SSP and breeds several species at the zoo! There are currently 36 institutions participating in the SSP and are managing 90 birds in the North American region. The population is stable and is at its target population of 90 birds.

Since 1994, AZA institutions have been sending surplus white-naped crane eggs to Russia to be reared and released to the wild. Currently, the International Crane Foundation is also involved in the conservation of White-naped cranes throughout their range in eastern Asia. The biologists at Khinganski Nature Reserve hand rear the chicks and release them to the wild in their 2nd year.

Ask: Can you think of any problems that might arise when biologists hand raise crane chicks?

Sometimes, baby animals, such as birds, will **imprint** on human 'parents' and then prefer their company to that of their own species. If biologists are not careful, these animals might not be likely to ever return to the wild or socialize appropriately with their own kind. So what do they do to prevent this?

In California and Arizona, at the Condor Recovery Project, eggs are incubated and the chicks are raised by caretakers using a hand puppet shaped like a condor head. Researchers at China's Wolong Panda reserve take it a step further – dressing in full, furry panda suits whenever they have to interact with the animals, believing that the cubs must live absent of all human contact if they are to have any chance of survival. The release protocol is being adjusted to decrease imprinting and socialization of the chicks on people.

<u>Activity: Creating a Crane Puppet</u>

In many projects involving hand raising baby birds, biologists will create hand puppets that mimic the actual parents of the bird. These puppets are shaped like and move like the head of the parent bird. In this activity, you will have your students create a functioning hand puppet meant to mimic a White-naped crane (you can also modify this project to include other birds).

How is a Beak Like a Tool? Part 1

Name: _____

Date: _____

Just like every tool has a specific function (purpose), so do the many different shaped bird beaks. Interestingly, the functions of birds' beaks are similar those of certain tools. For example, a duck's long, flat beak acts like a strainer in separating the small plants and invertebrates it wants to eat from the water.

Did you know that the most important adaptation (function) of a bird's beak is feeding? A bird's beak is shaped according to what it eats. Some beaks are intended to crack seeds while others are meant to catch fish. As varied are birds' diets, so are their beaks.

Part 1

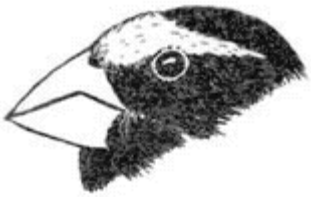
Look at the example given in the table below, and then conduct an Internet search to assist you in completing the table (7 more *different* beak shapes). You may find it helpful to google "Bird beak" or "Bird beak adaptation."

Shape of Beak (sketch)	**Description of Beak**	**Species**	**Types of Food Eaten by this Species /Beak Type**
1. Example	Long, straight, very pointed (sharp)	Loon	Fish, sometimes located deep in the water
2.			
3.			
4.			
5.			

6.			
7.			
8.			

Bird Beaks

Did you ever wonder why there are so many types of bird beaks or bills? The most important function of a bird bill is feeding, and it is shaped according to what a bird eats. The bill is one of the characteristics used to identify birds. You can learn about bird behavior by looking at the bill and thinking about what it eats. Then you may think about where it lives, and so on. Below are some common bill shapes and a description of the food they are especially adapted to eat.

	A **cone shaped bill** is found in many birds such as finches and grosbeaks. It is a strong beak used for cracking seeds.
	Thin, slender, pointed beaks are found mainly in insect eaters. They are used to pick insects off leaves, twigs, and bark. This warbler is a good example.
	Woodpeckers have strong beaks which taper to the tip, forming a **chisel** for pecking holes in trees for food or nests. Most feed on insects which live under the bark.
	Hummingbirds have long, tubular bills that resemble straws, which they use to sip nectar from flowers.
	Mergansers, specialized for eating fish, have sharp tooth-like structures on the edge of the bill to hold fish tightly.
	Hawks, owls, and other birds of prey which catch and kill live prey have sharp, "hooked" beaks. These are used to bite the skull or neck and also to tear the body into pieces small enough to swallow.

	The edges of a Mallard's bill are fringed to strain plants, seeds, and small animals from mud and water.
	Beaks which are flat and wide at the base are found in birds which catch insects in flight, such as flycatchers. These birds also often have whiskers at the corners of the mouth, which effectively widens the mouth opening, allowing more effective capture of prey.

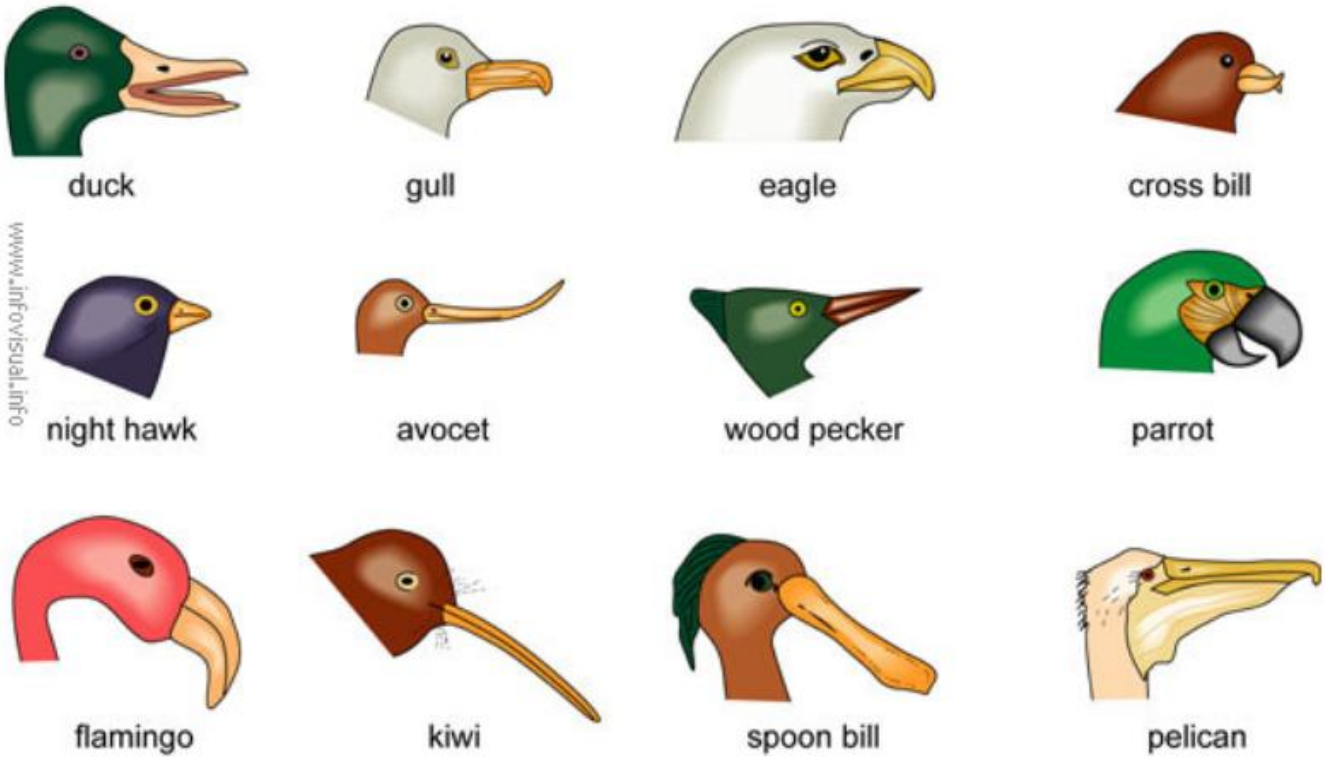
Bird Adaptations - Beaks

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 attentions 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.
	Tweezer	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



How is a Beak Like a Tool? Part 2

For each tool listed in the table, cut out and glue the corresponding picture in the correct box, give the function of the tool, describe the tool's characteristics, and glue the picture of the bird whose beak most resembles the tool.

Name of Tool	**Picture of Tool** **(glue here)**	**Function of Tool** **(What is used for?)**	**Tool Characteristics**	**Corresponding Bird Beak (glue here)**
Chisel		To cut or shape wood, stone, or metal (sometimes used by sculptors)	Long, thick, blade with a sharp edge Flat edge on handle (for hitting with hammer)	
Dip Net				
Nutcracker				

Name of Tool	Picture of Tool (glue here)	Function of Tool (What is used for?)	Tool Characteristics	Corresponding Bird Beak (glue here)
Probe				
Shears (scissors)				
Spear				
Strainer				

Name of Tool	Picture of Tool (glue here)	Function of Tool (What is used for?)	Tool Characteristics	Corresponding Bird Beak (glue here)
Straw				
Tongs				
Tweezers				

BIRD BEAKS


duck


gull


eagle


cross bill

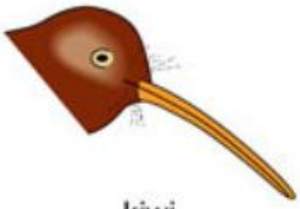

night hawk


avocet


wood pecker


parrot


flamingo


kiwi


spoon bill


pelican

TOOLS


nutcracker


chisel


strainer


tongs


spear

knife

straw

hook


tweezers

vicegrip

scissors

probe

This is for the Birds

Bird Beak Design Project

Names _____

_____

Project Due Date: _____

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Bird Beaks

Introduction:

Sometimes baby birds will imprint on human 'parents' and then prefer their company to that of their own species. If biologists are not careful, these animals might not be likely to ever return to the wild or socialize appropriately with their own kind. These chicks are raised by caretakers using a hand puppet shaped like a crane head.

Our class has been asked to help a wildlife refuge by designing a functioning hand puppet that will mimic the head of a White-naped crane. Your team will present your designs and models to representatives from the wildlife refuge.

Your Task:

Using your knowledge of bird beaks and levers, you are to build a functioning model of a crane head and beak. You will also need to include a written summary of your bird research. *

*** You may want them to include an oral presentation**

Bird Beak Design Journal

Define the Problem:

Use the information in the introduction to formulate a question about this problem.

Problem:_____

_____

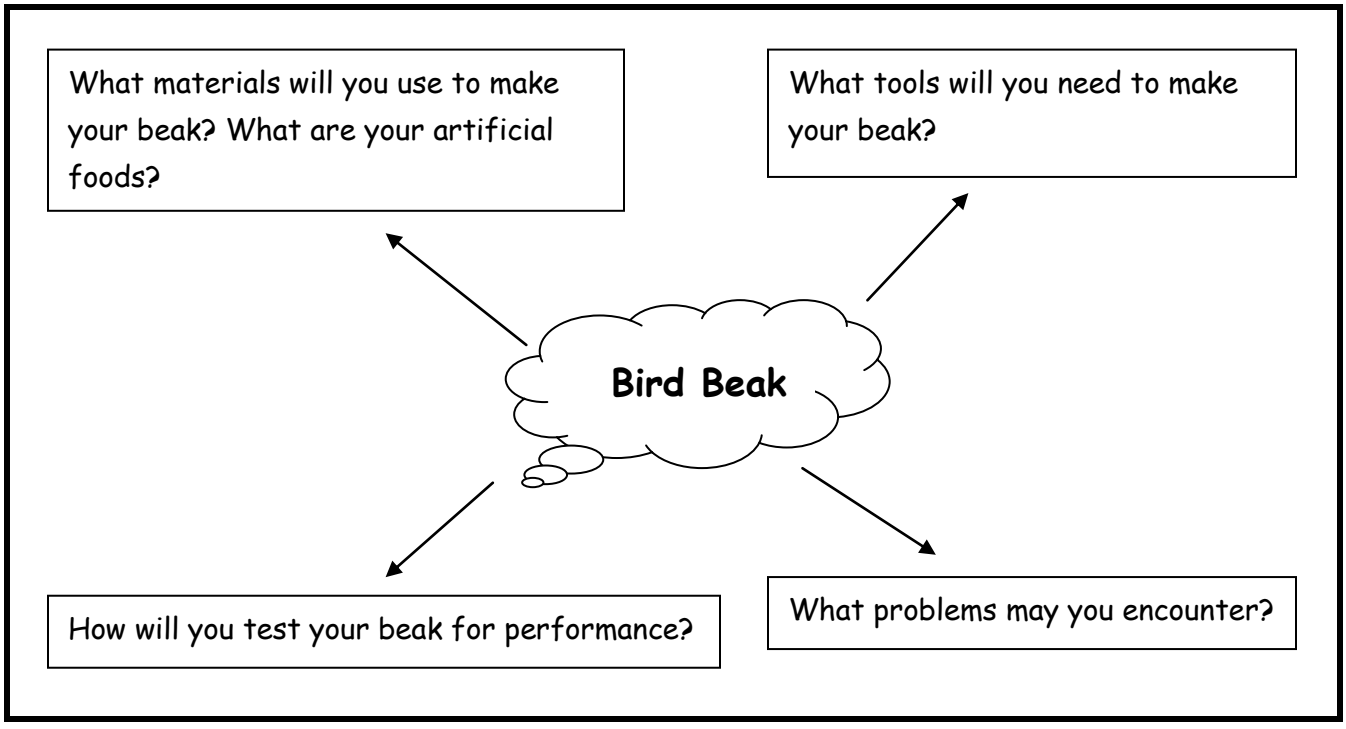
_____

Name of bird choice: _____

Beak Shape: _____

Bird's Main Diet: _____

Consider the Solution: Brainstorm the following:



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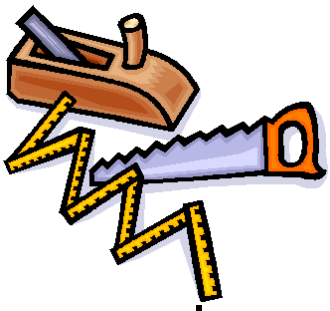
Select Best Solution for Materials:



List the materials and tools needed to build your prototype

Important things to remember:

- Use your materials efficiently
- The minimum beak size is the length of your hand.
- The beak must open and close using the action of your hands.
- The bird must pick up its food.

Material List:

1._____ 6. _____

2. _____ 7. _____

3._____ 8. _____

4. _____ 9. _____

5._____ 10. _____

Sketch and Label: Use pencil to draw a diagram of your Prototype. Label the materials used and the parts of your lever.

Name the type of lever used:_____

Build the Prototype:

Record any problems, limitations and modifications you need to make **as you build** your prototype. Minimum of four problems listed.

Problems:	Modifications:	Did it help?
1.		
2.		
3.		
4.		
5.		
6.		

Test the Prototype:

Design an experiment to test the feeding efficiency of your birds beak.

Problem / Purpose:_____

_____

Hypothesis:_____

_____

Variables Tested:

Independent:_____

Dependent: _____

Procedure Instructions:

Create the simulated environment and provide artificial food that represent the bird's diet. List the experiment instructions: 1,2,etc.

_____

_____

_____

_____

_____

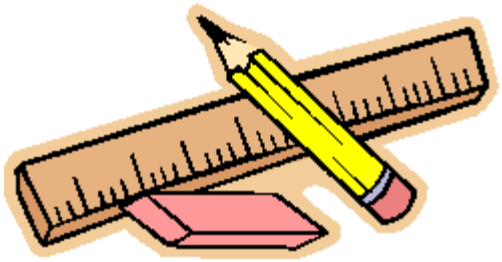
_____

_____

Results / Data Table:

Collect the data and make sure to organize it neatly in a table. Use a pencil and a ruler. Include three trials for each food item along with a column for averages.

Graph Your Results:



Title:_____

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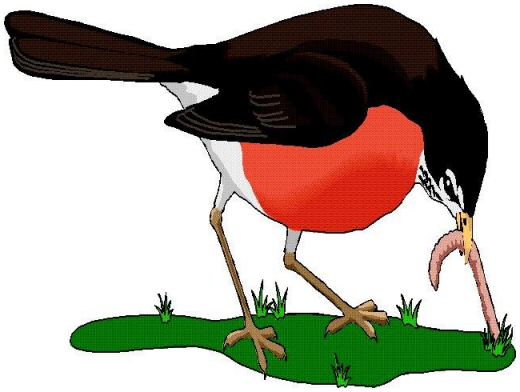
Questions:



1. Describe how you could change and improve the procedure for testing the prototype?

Conclusion: Analyze your results and explain why they prove or disprove your hypothesis.

Appendix

Glossary

Adaptation: A physical or behavioral process whereby an organism becomes better able to live in its habitat

Conservation status: Indicates members of a species are still alive and how likely the species is to become extinct in the near future. Many factors are taken into account when determining conservation status: the number of individuals remaining, the overall increase or decrease in the population over time, breeding success rates, known threats, etc.

Endangered: facing a high risk of becoming extinct

Forage: To go from place to place to look or search for food.

Habitat degradation: when habitats are displaced or destroyed, making them unable to support the species present

Imprinting: Imprinting refers to a critical period of time early in an animal's life when it forms attachments; birds and mammals are born with a pre-programmed drive to imprint onto their mother. Imprinting provides animals with information about who they are and determines who they will find attractive when they reach adulthood.

Species Survival Plan (SSP): a program developed in 1981 by the American Association of Zoos and Aquariums (AZA) to help **ensure the survival of selected species in zoo and aquariums**, most of which are threatened or endangered in the wild.

Vulnerable: Facing a high risk of extinction in the wild.

World Map

Fun Facts!

Did you know…

- Cranes will "dance" with each other. This "dancing" may be courtship displays, defensive displays, or merely a way to release energy.
- During a crane "dance", they may leap up to 8 feet off the ground!
- Cranes use loud vocalizations to warn intruding cranes of their trespass. If the intruding crane does not heed the warning, a fight may result.
- White-naped cranes are an important symbol in Asian art and folklore.

White-naped cranes at the Red River Zoo…

- The zoo currently has two white-naped cranes, Sam and Stan, who are located in our new crane exhibit.
- Our cranes have had their wings clipped and can't fly.
- Cranes are territorial and Stan is no exception! He is slightly aggressive towards humans and is often seen pecking the plexi-glass that separates him from the visitors.