

Crane Nuggets

What makes a crane a crane?

Their **long beak** helps cranes find food. They also use their beak to drive away other cranes or predators.

Most cranes have a bright **red patch** of bare skin on their head. A crane shows this red patch as a warning to other cranes intruding on its **territory**, or home.

W5-8 foot Wingspan!!

A bird's wingspan is the distance from wing tip to wing tip.



Cranes have a **loud, shrill voice**. Their calls can be heard up to two miles away! The secret to their loud call is a long windpipe, which is coiled up inside their chest. Do you know any musical instruments which are long, but coiled up?

What is your "wingspan"?

Take a look at those **long legs!** Cranes live in wet, soggy places called **wetlands**. Long legs make it easy for cranes to walk through tall marsh grasses and wade in shallow water. Some cranes are over five feet tall. How tall are you?

Some sandhill cranes are **gray**, but in the spring they paint themselves with mud so they look **brown**. Why do you think they do that?

Did you know that cranes can live up to thirty years in the wild?
A pair of cranes may stay paired for life!

WHERE IN THE WORLD?

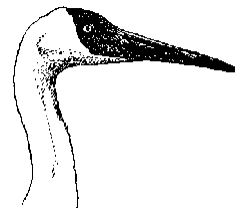
When there are very few members left of an animal or plant **species**, or kind, we say that the species is **endangered**. The crane family is one of the most endangered families of birds, with almost half of the 15 species considered endangered. This map shows all of the endangered species of crane and where they are found in the world.

On the world map below, label each of the seven continents. With a red pencil, draw a line from each endangered crane to the continent where it lives.

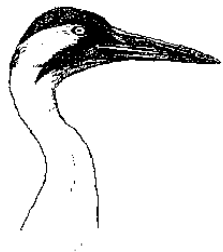
How many endangered species are there?

Which continent has the most endangered species?

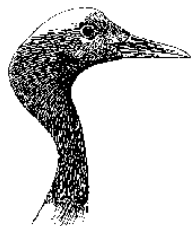
There are no endangered cranes in South America or Antarctica. Do you know why?



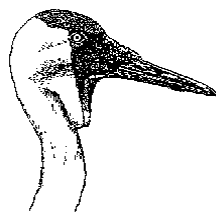
Siberian crane
Asia



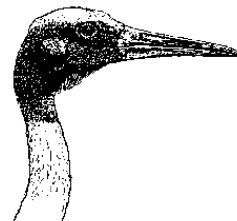
whooping crane
North America



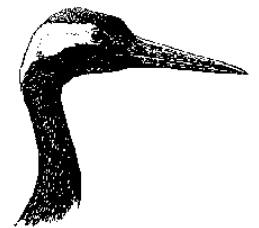
blue crane
Africa



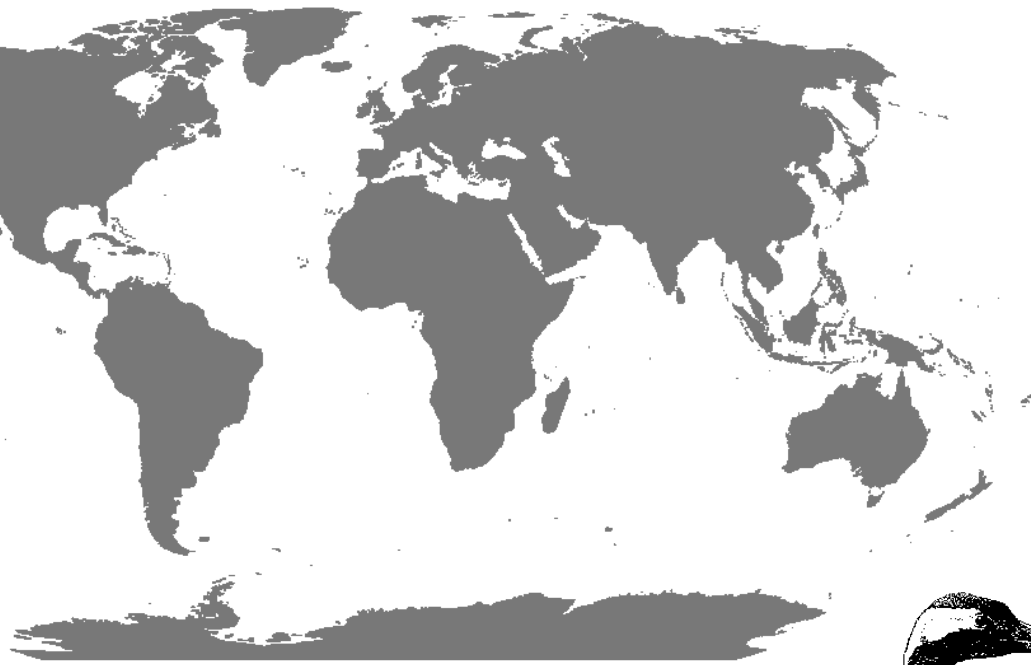
wattled crane
Africa



sarus crane
Asia

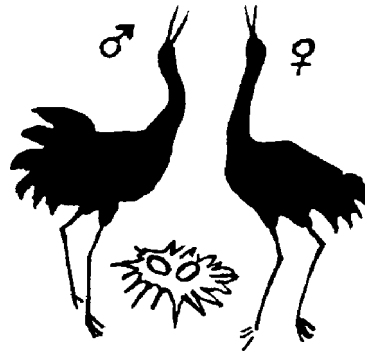


red-crowned crane
Asia



AND THE SEASONS...

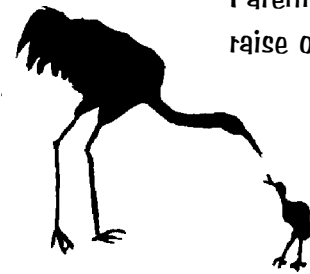
Pair establishes territory, builds a nest on the ground, and lays eggs.



Family migrates north. Chick separates from adults.

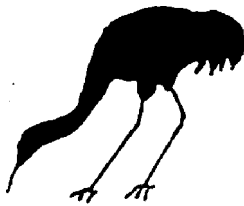
Parents usually raise one chick.

SPRING



WINTER

Summer



Cranes will forage for food in wetlands, prairies, and even farm fields.

Fall



Parents and chick migrate south.



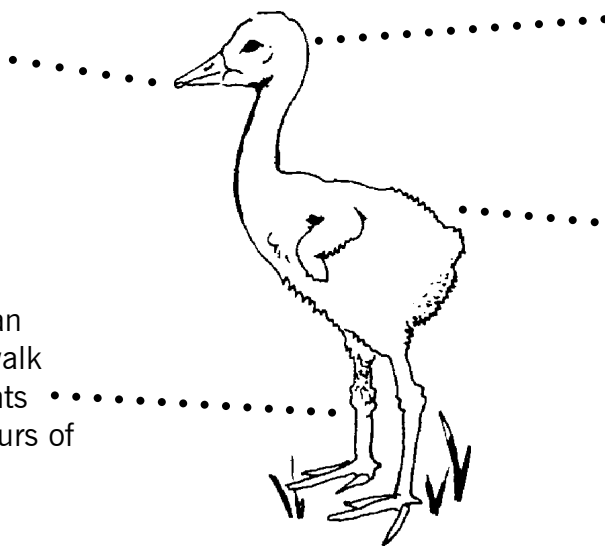
Chick grows rapidly, gets first complete set of feathers (**fledges**) and learns to fly.

...THEY GO ROUND & ROUND!

Chick Chat...

Baby cranes are called chicks, or colts. Even though it takes a lot of energy to hatch, crane chicks can do many things within just a few hours:

Crane chicks have a strong beak. The chicks start taking food from their parents when they are one day old.



• Chicks can see from the moment they hatch. This helps them know who their parents are.

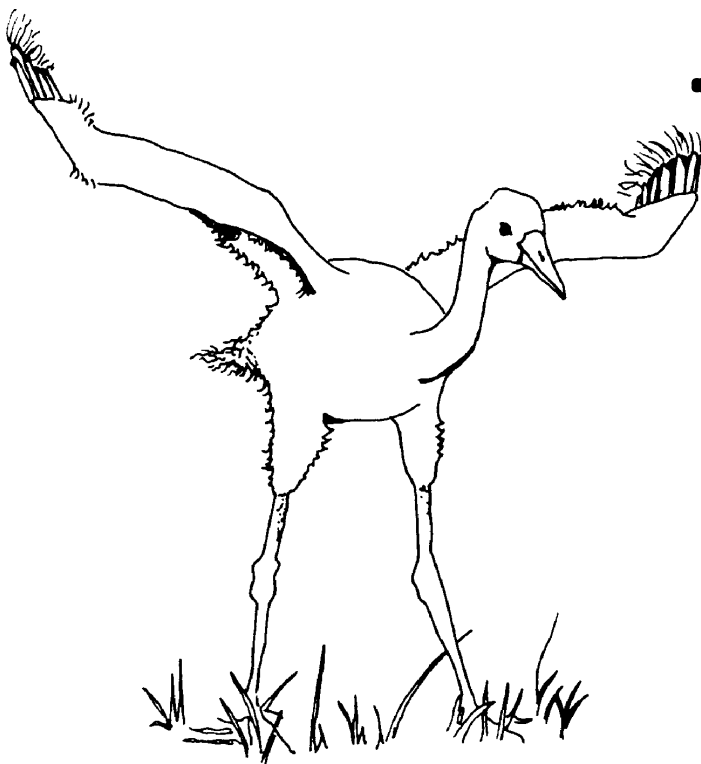
Crane chicks can stand up and walk with their parents within a few hours of hatching.

• They have fluffy, cinnamon-colored feathers called down feathers that keep them warm. You probably know how warm a down jacket can be! Their reddish-brown color helps them hide from predators in the grasses near their nest.

Can you name a type of bird whose chicks hatch **without** strong beaks, strong legs, fluffy feathers, and open eyes? (hint: look at the picture to the right)



Why is it important that crane chicks are different from a robin or other songbird chick?



...and Growing Up

Crane chicks grow very fast! For the first two months after they hatch, they grow about an inch every day! After only three months, they are four or five feet tall (almost as big as their parents) and learning how to fly.

How big were you when you were three months old?

How big would you be now if you grew an inch every day?

Crane Count!

Cranes have many predators, or animals that may attack them or their chicks. In the wild, adult cranes protect their chicks from predators, such as raccoons, by intimidating or attacking the unwelcome intruders. To finish drawing the picture below, solve the following math questions and find the answers on the dot-to-dot puzzle. Connect your answers in order, beginning with the first question, until the picture is complete.

1) $49 + 4 =$

15) $58 - 3 =$

29) $43 \times 1 =$

34) $5 \times 5 =$

2) $1 + 6 =$

16) $4 \times 7 =$

30) $12 - 9 =$

35) $50 - 6 =$

3) $7 - 2 =$

17) $9 + 9 =$

31) $9 \times 3 =$

36) $49 + 5 =$

4) $5 \times 9 =$

18) $7 - 5 =$

32) $5 \times 6 =$

37) $9 \times 7 =$

5) $16 + 8 =$

19) $4 + 5 =$

33) $15 + 17 =$

38) $11 + 11 =$

6) $6 \times 7 =$

20) $2 \times 5 =$

39) $49 - 9 =$

7) $54 + 8 =$

21) $15 - 4 =$

40) $60 - 7 =$

8) $21 - 17 =$

22) $12 + 7 =$

9) $14 - 6 =$

23) $4 \times 4 =$

10) $22 + 14 =$

24) $5 + 7 =$

11) $7 \times 2 =$

25) $3 \times 7 =$

12) $8 \times 9 =$

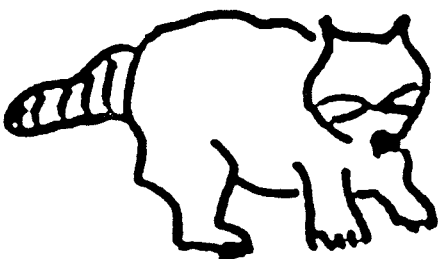
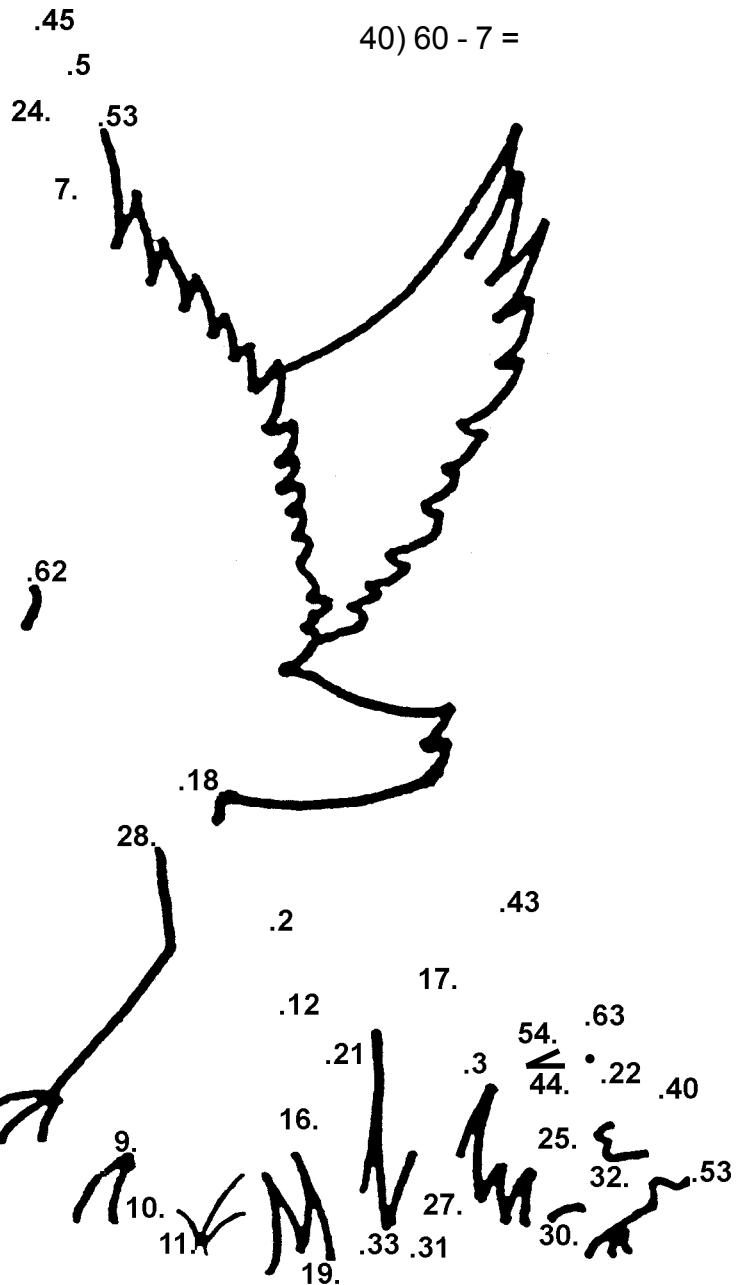
26) $37 - 4 =$

13) $18 - 3 =$

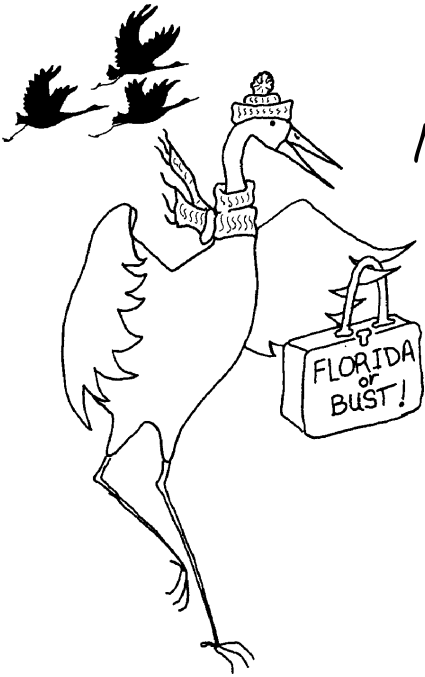
27) $4 + 27 =$

14) $6 + 23 =$

28) $37 - 20 =$



Sandhill Crane Migration



Many birds fly from one part of the world to another and back again each year. This seasonal movement of birds is called **migration**. Most species of crane migrate to and from their breeding areas in response to changes in the weather and their food supply.

When?

In the spring and again in the fall, Wisconsin's sandhill cranes migrate. When the days start to get shorter in October and November, they know that it is going to get cold and their food will become harder to find. These changes in their environment prompt the cranes to begin their migration south for the winter. In the spring, the days get longer again and the cranes know it's time to return north to their breeding areas.

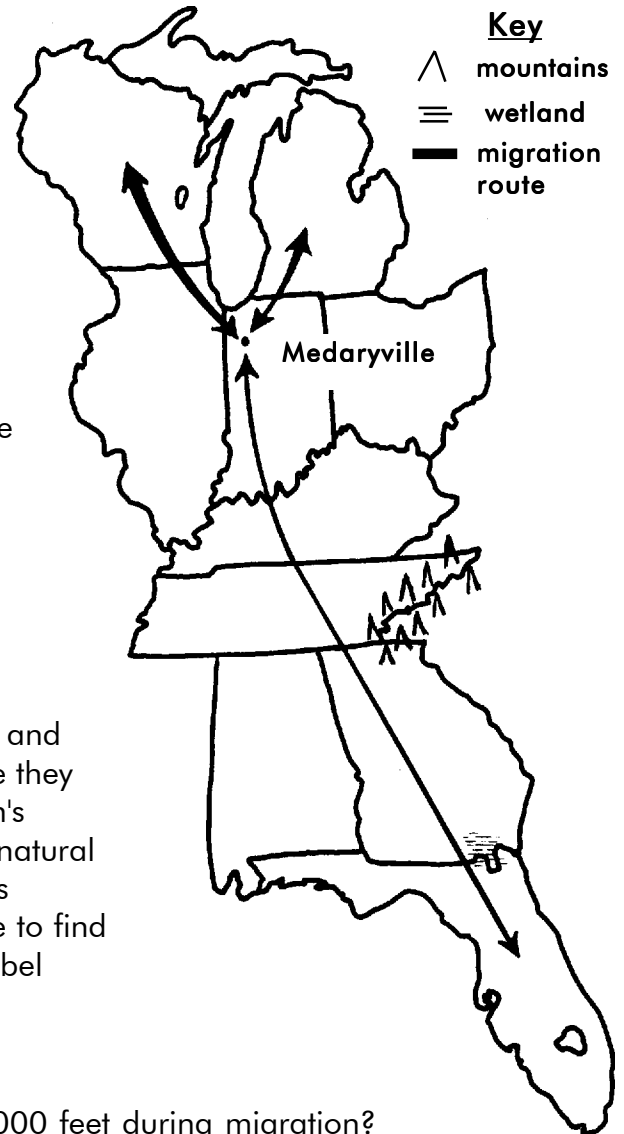
Where?

Wisconsin's sandhill cranes migrate from the Midwest to Florida—a trip of over one thousand miles. On their way to Florida they stop and rest at places where they can find food and protection from people and predators. These resting places are called **staging areas**. One of the largest staging areas for sandhill cranes in the Midwest is the Jasper-Pulaski State Fish and Wildlife Area near Medaryville, Indiana.

Follow the line from central Wisconsin to Medaryville on the figure to the right. Why do you think the migration route between Wisconsin and Indiana does not go over Lake Michigan? Next, follow the line to Florida. What states do the cranes pass through between Indiana and Florida?

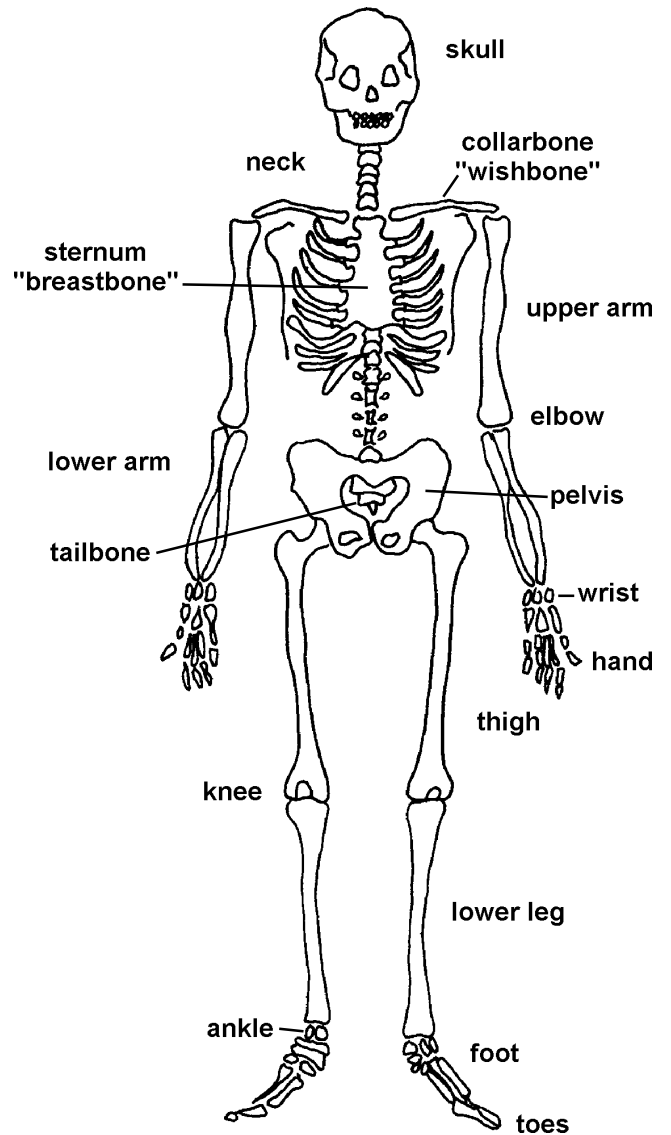
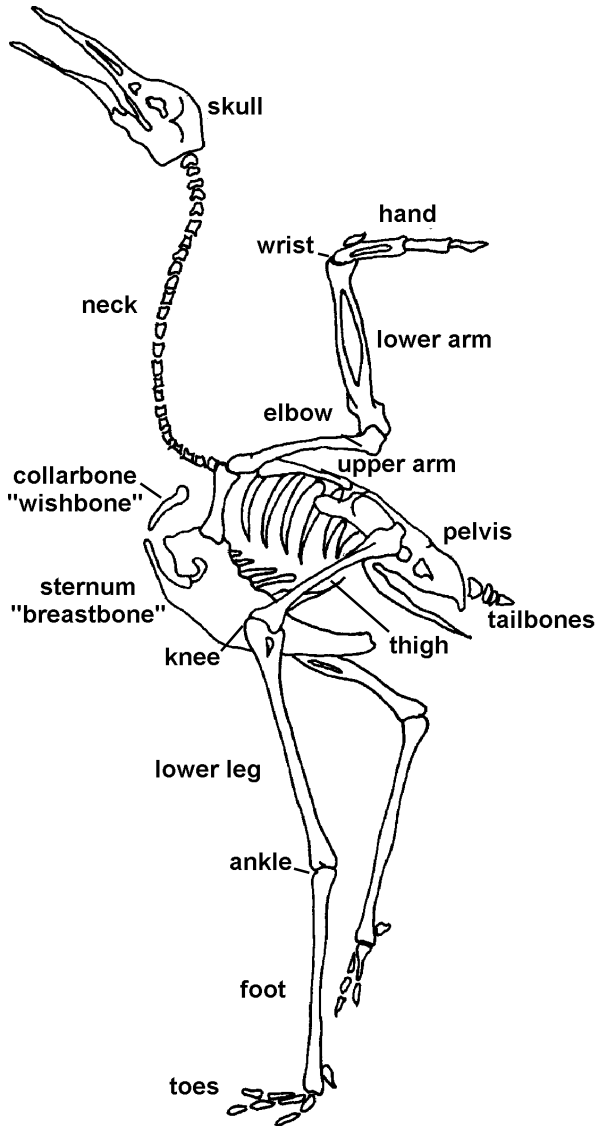
How?

When birds migrate they need to figure out where they are and where they are going. How do you think they do this? Since they can't carry a map, we think that cranes might use the Earth's magnet field, the position of the sun, moon, and stars, or natural and man-made landmarks, such as mountains or cities, as guides. If you were a crane, what landmarks could you use to find your way to Florida and then back to Wisconsin again? Label these landmarks on the figure.



Did you know that cranes can fly as high as 12,000 feet during migration? That's almost as high as a jet plane!

OH DEM BONES !



Crane and human skeletons are very much alike, but there are also important differences. Some of the differences are easy to see, others are more difficult.

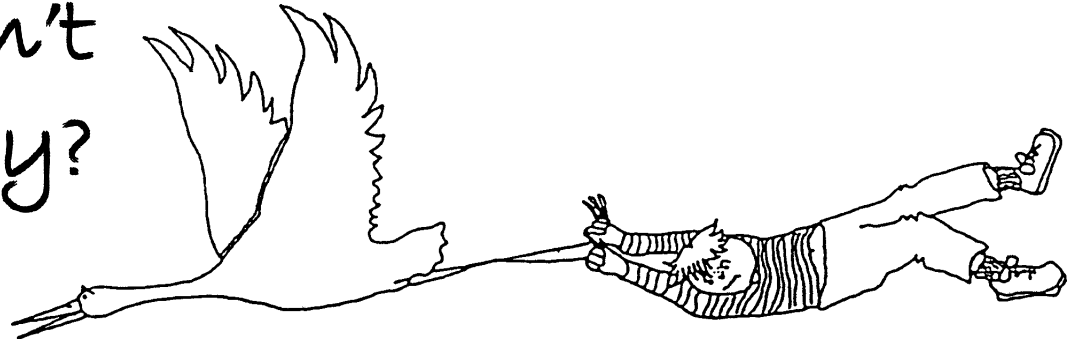
Cranes and humans have many of the same bones. Color the upper arm bones in each skeleton red. Color the sternum in each skeleton green. Do this for all the remainder of the labeled bones using different colors.

Are you surprised that crane skeletons have the same bones as human skeletons?

Did you notice that while cranes and humans have some of the same bones, the bones look very different? This is because they are used for different things.

For example, how are the hand bones different between the two skeletons? The bones are different because humans and cranes use them for different purposes. How do people use their hands, and how do cranes use their hands?

Why Can't Kids Fly?



So...you think you'd like to fly?

We are going to have to rearrange you...a lot.

Just try to lighten up!

First, you need lighter bones. Right now your bones are pretty solid and heavy. To make your bones lighter, we can **hollow** them out. However, hollow bones are weaker, so let's reinforce them with lightweight supports called "struts." We can fill the rest of your bones with air cells.

To make your skeleton even lighter, let's get rid of some **unnecessary bones**: You don't need all those fingers since you won't need to pick anything up with your hands. And we can eliminate some toe bones as well. We can also remove your jawbone and teeth. You won't need them and they're pretty heavy. We'll give you a beak instead, which is a lot lighter.

Good. Your skeleton is in pretty good shape—**lighter and stronger**.

Next, let's rearrange your muscles!

Are your legs or arms stronger? Is it easier to stand on your legs or your arms? If you expect to fly, you'll need to support your whole body with your arms! Let's see, we'll order **larger muscles** for your new wings and replace those big muscles in your legs with smaller ones to save some more weight.

Oh no! Where will we attach those bigger new flight muscles? Your existing **breastbone** won't do—it's just not big enough. So we'll place an order for a bigger model.

Now what?

How far can you run before you run out of breath? Cranes can fly all day! Maybe we better get you a new set of **lungs**, ones that will supply your big muscles with all the oxygen they need to keep on flapping.

Anything else?

You bet! If you expect to fly, you'll need a completely new **navigation and guidance system**. Let's see, that would include new eyes, better reflexes, ...and a brain that can organize all of this new data. You're going to have to make an awful lot of new decisions while flying to control your speed, wing movements, and landing gear.

O.K., you think you want to fly? I'd suggest you take an airplane!

Amazing Adaptations

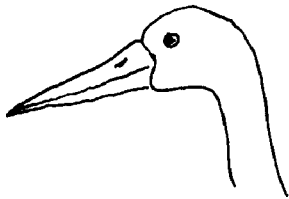


Adaptations are changes in an animal's body or behavior that help it survive in its environment.

Cranes have important adaptations of their bill and feet. By looking at the size and shape of the bill you can tell what kind of foods different birds eat. By looking at the size and shape of the feet you can tell something about where the bird lives.

Types of bills:

Can you match each bill below with the feeding style it was designed for? (seed-crushing, tearing, scooping, probing)



a _____



b _____



c _____



d _____

What food item would each kind of bill be good at catching?

a _____

b _____

c _____

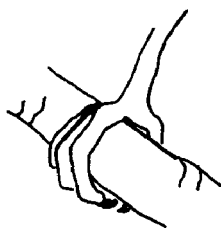
d _____

Types of feet:

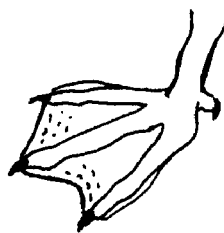
Can you match the feet below with the activity they were designed for? (climbing, swimming, perching, wading, grasping)



a _____



b _____



c _____



d _____



e _____

Name one bird that has each kind of feet:

a _____

b _____

c _____

d _____

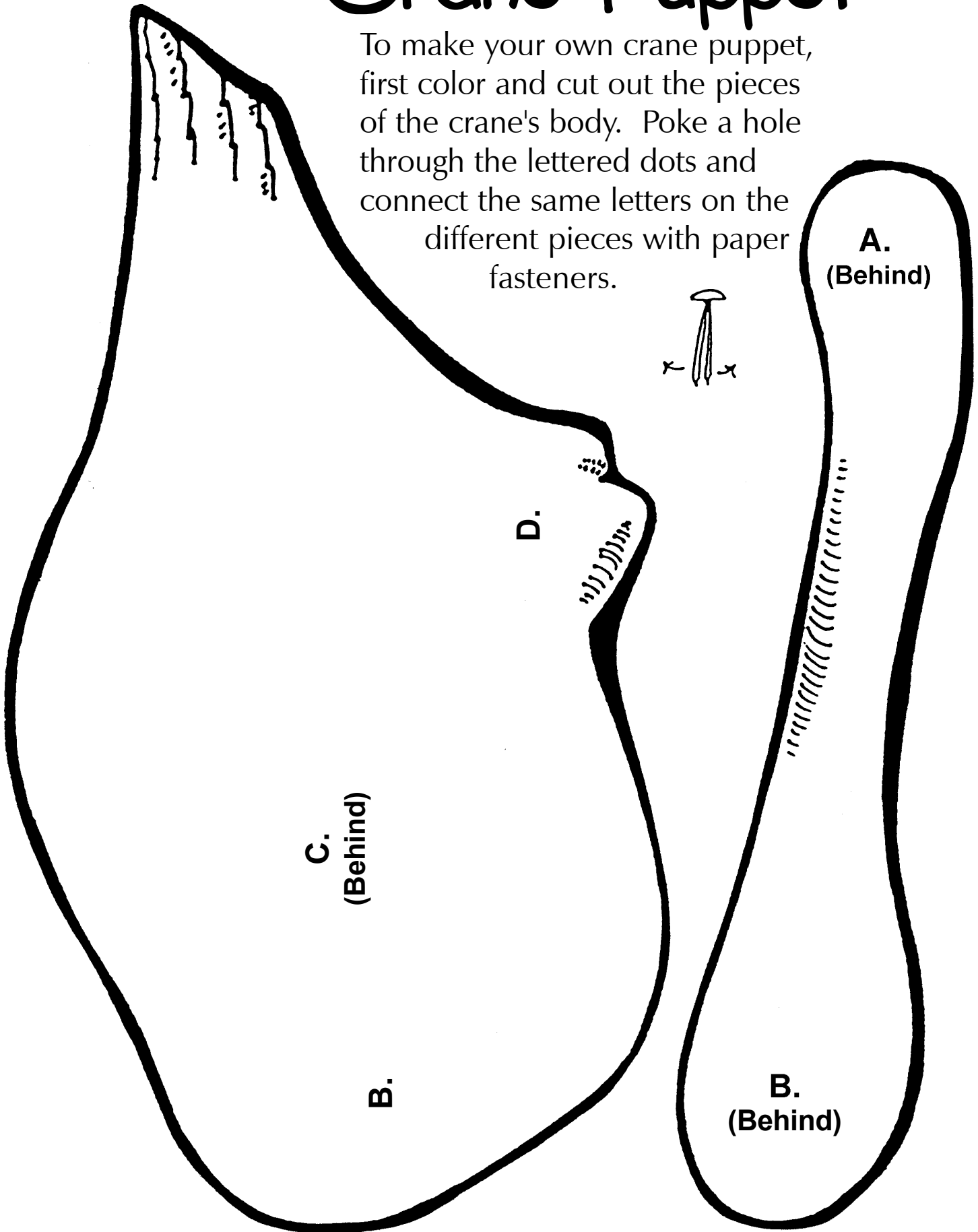
e _____

Cranes live in wetlands and like to eat insects, roots, water plants, fish, frogs, crabs, grains, and snakes. What sort of beaks and feet do you think cranes need? Why?

What are some of the special adaptations that people have?

Crane Puppet

To make your own crane puppet, first color and cut out the pieces of the crane's body. Poke a hole through the lettered dots and connect the same letters on the different pieces with paper fasteners.

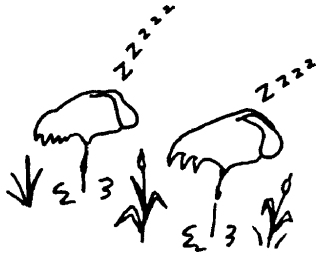




Cranes and Wetlands

Cranes live in wet, soggy places called **wetlands**. A wetland is a place where water and land mix, at least part of the year, and the soil becomes soggy. Wetlands have many different names. They can be called **bogs, swamps, marshes, or estuaries**.

Cranes need wetlands as a place to (circle the best answers):



- rest during migration
- shop
- raise their young
- go to the post office
- play video games
- find protection from predators
- find their food
- go to school
- build a nest
- take piano lessons

Cranes live in wetlands, but lots of other species call wetlands home, too! Animals like deer, herons, spiders, and salamanders live in wetlands, along with plants such as bulrush, iris, and wild rice.

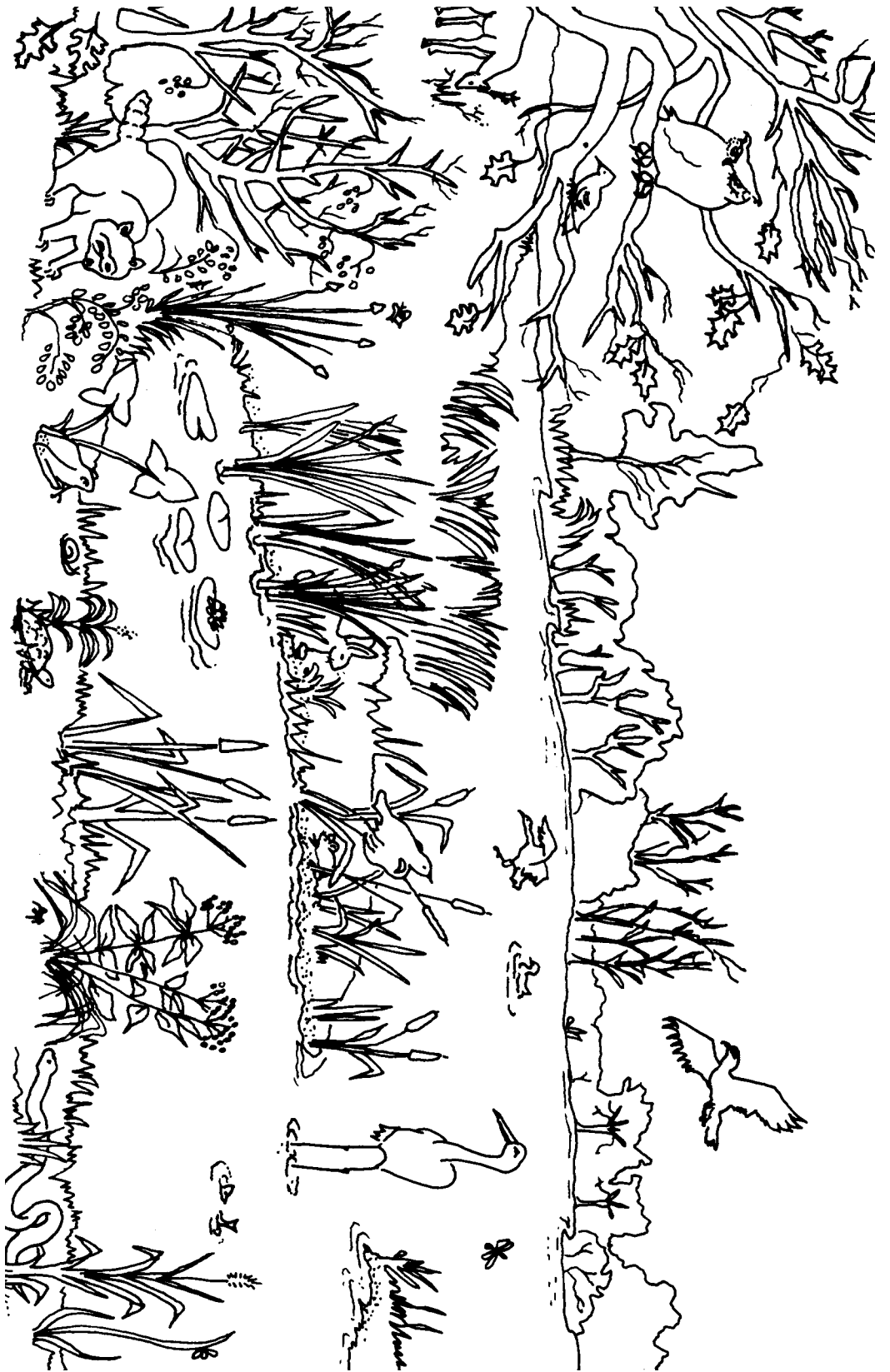
All of these plants and animals have special **adaptations** that allow them to live in a wetland. For example, frogs and snakes have smooth skins that easily shed water, and ducks have webbed feet, which are perfect for swimming. Cranes have long legs, a long beak, and a long neck, which are perfect adaptations for wading through tall grasses, shallow water, and searching for food.



Below are the scrambled names of some plants and animals that live in wetlands. Can you unscramble them?

1. nails
2. roonacc
3. rcane
4. akesn
5. liattac
6. ogfr
7. kcud
8. letrut
9. flygondra
10. tibabr

Wet & Wild!



Wet and wild--that's a **wetland**. A crane's **habitat**, or home, is a wetland. In their habitat, cranes find food, protection, and a place to build their nests. Cranes like to eat insects, seeds, fish, frogs, worms, mice, and water plants. Because they eat both plants and animals, they are called **omnivores**.

Lots of other plants and animals live in wetlands. Together, they form a **community**--a wetland community! If one plant or animal in a community disappears, others that depend on it may disappear, too.

Look in the picture of the wetland community. Can you find ten plants and animals that cranes like to eat? Draw a line from these wetland treats to the crane. What other animals can you find in the wetland? Do they eat any of the same things that cranes eat?



Read the following story aloud in class. As you read, imagine that you are experiencing the sights and sounds described in the story. Have you ever had a wetland adventure? If so, share your story with your class.

Imagine yourself paddling a canoe along the edge of a pond. It is sunset. Your best friend is in the front of the canoe watching for any signs of life. You hear splashing! As you round the corner, you see a raccoon near the water's edge. It is trying to open a clam it has just found.

You drift on silently...a chorus of bullfrogs stop in mid-song, alarmed at your approach. Tiny water bugs skim the surface of the pond, circling each other in a playful game. A delicate damselfly settles on the side of your canoe, quietly hitching a ride.

When you find the perfect spot to beach your canoe, you hop out and decide to explore. The grasses and cattails grow so tall that you can barely see over them. Walking along, the mud under your feet seems determined to steal your shoes! Your friend discovers a little stump nearby. A perfect lookout tower! You climb up and take a sweeping glance at the pond in front of you.

Something moves a few hundred yards out in front of you. What could it be? Looking through your binoculars, you see some kind of bird. It is about four feet tall, has a very long neck, and a long spear-like beak. Its feathers look brownish gray, and it has a bright red patch on its forehead.

Your heart beats wildly! It is a sandhill crane! You quickly jump down from the stump and let your friend have a look. Never before have you seen such a big bird in the wild.

While your friend looks at the beautiful bird, you settle back, close your eyes, and listen. You can hear the wind blowing through the tall grasses and cattails. The steady hum of insects fills the air. How many tiny creatures does it take to make all that noise?

The sun slowly fades behind the trees at the far end of the pond. You catch a glimpse of a bat flying silently overhead. It's time to head for home. On the way back to the canoe, you notice deer tracks in the mud. You take a deep breath. Maybe you'll get to see one. You wait for a few minutes. No luck.

Your friend quietly slips into the canoe. Holding on to the back of the canoe, you give a final push with your feet and you hop into the back seat.

You have found the magic! You have squished through the muddy soil, walked among the tall reeds and grasses, and seen many beautiful animals.



From their name, you can probably guess that wetlands are sometimes covered with water. Sometimes they are completely dry. Usually they are somewhere in between. Wetlands can be as large as the Okefenokee swamp in Georgia, or as small as a wet place along the roadside that has a few cattails and some nesting birds. **Why are wetlands so special?**

They Store Ground Water:

Did you know that much of the earth's fresh water is underground? It is stored in cracks and holes in the rocks and soil. How does the water get there? Wetlands often collect water from rain and melting snow and allow it to slowly trickle into these openings.

Try to think of wetlands as a big bank safe. Instead of holding money and jewels, they hold something even more precious. They hold much of the water that we use for drinking, washing, and other important activities. Can you list 20 ways that people use water every day? What would we do without water?

They Help Prevent Floods:

What sometimes happens when we get too much rain or snow melt? Wetlands can hold this extra water and slowly release it into nearby lakes and streams. It is very important that the water is released slowly so that the rivers and streams don't overflow.

If wetlands disappear, where would all that extra water go? Have you ever seen a flood? What happens to the houses, farms, and buildings during a flood? Do you think wetlands are important?

They Help Keep Our Water Clean:

Have you ever used a screen as a sifter in a sandbox? You might have noticed that the small pieces of sand fall through the sifter while the larger rocks and sticks are held on the screen. A wetland acts just like that screen. If there is pollution or dirt in the water that enters a wetland, some of it can be separated just like the rocks and sticks on the screen. Then, the clean water trickles into our underground water supply and makes its way into our lakes and streams.

They Provide Habitat For Plants & Animals:

Wetlands provide **habitat** for many plants and animals. Many endangered species live in wetlands, as do many creatures that are important to humans. Wetlands are home to mink, otter, muskrat, and beaver. All of these animals have been important resources because of their fur. Wetlands provide protection for deer, raccoons, pheasants, and other animals. Even fish use wetlands as a place to lay their eggs. They are also home to plants such as cranberries and wild rice. Have you ever eaten plants or animals that depend on wetlands? Are wetlands important sources of human food?

CLASSROOM WETLAND EXPERIMENT



BACKGROUND

Cranes are sometimes called **indicator species** of the environment because they are dependent upon many other species for food and survival. If the cranes are doing well, it **indicates** that their wetland community is also doing well. Not only are wetland areas important to cranes and other wildlife, but they are also important to people. Wetlands collect water from surrounding areas and slowly release it to streams, lakes, and oceans. During this slow travel through the wetland, many pollutants and sediments settle out or decompose. As a result, the water that reaches rivers and streams is much cleaner. If ditches are built through the wetland, excess water races through them, flooding downstream property and polluting lakes and streams.

Here's an experiment you can try in your classroom to create a model of how wetlands work.

You will need:

- 1 bread pan
- 1 large sponge (4 x 7 x 2 inches)
- 2 tsp. soil
- measuring cup
- water
- 1 brick

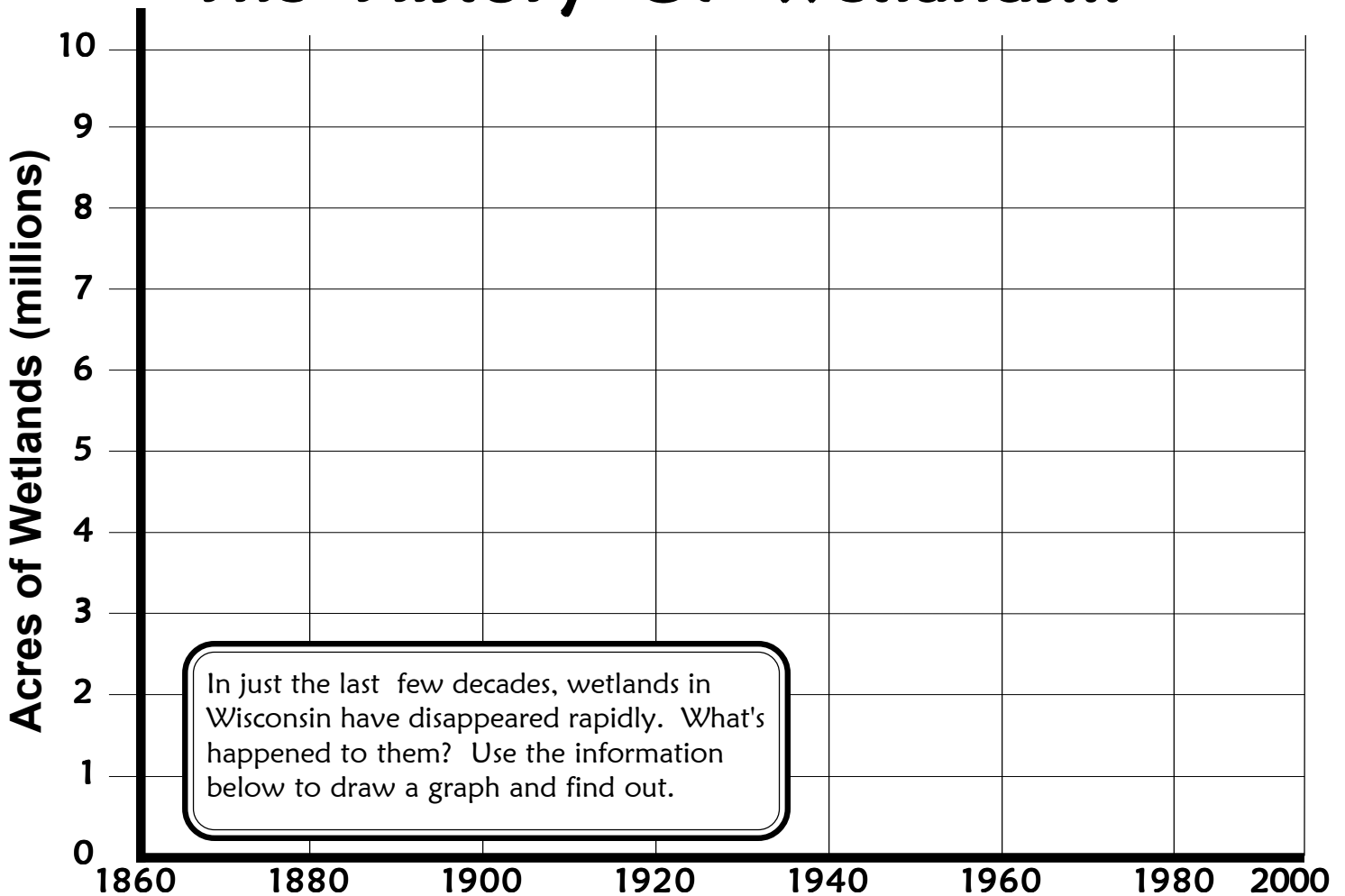
PROCESS

1. Place the brick in the bread pan. Sprinkle 1 tsp. of soil (our pollutant) at one end of the brick. Tilt the pan, soil end at the top, and slowly pour 1 cup of water over the brick. Remove the brick from the pan and measure the remaining water. Is it "polluted?" Empty the water out of the pan.
 2. Place the sponge in the pan. Sprinkle 1 tsp. soil (our pollutant) at one end of the sponge. Tilt the pan again, soil at the top, and slowly pour 1 cup of water over the sponge. Carefully remove the sponge and measure the remaining water. Is it "polluted?"
-

How is the brick like a drainage ditch?

How is the sponge acting as a wetland does in controlling pollution and flooding?

The History Of Wetlands...



1860 -- When the first European settlers arrive in the state, Wisconsin has about **10 million acres** of wetlands. Native Americans and the early settlers use wetlands for hunting and gathering food.

1900 -- More settlers begin to change wetlands by draining and filling them to grow food and build homes. About **9.8 million acres** remain.

1920 -- Dairy farming becomes important in Wisconsin. Wetland areas are turned to pasture for livestock. **8.9 million acres** left.

1940 -- Wisconsin's human population continues to grow. More people need more food. Potatoes, onions, and carrots are grown in areas where wetlands were drained. Wetlands have shrunk to **8.7 million acres**.

1960 -- With only **6.2 million acres** left, scientists begin to realize that wetlands are important. Wetlands can prevent floods, help keep ground water clean, and provide habitat for many plants and animals.

1980-2000 -- Through education and controlled development, we have been able to slow the loss of wetlands in the state. Lots of people are learning that wetlands are important. Still, only about **5.3 million acres** of wetlands remain in Wisconsin. Our challenge today is to begin restoring wetlands lost during the last 150 years.

How does the story end? That's up to us. Already we've lost almost half our wetlands in 150 years. Should we protect our remaining wetlands and use them wisely?

Getting to the Root of Prairies

Prairie communities are open areas where the ground is covered by grasses and flowering plants, but few or no trees. Cranes feed on insects and seeds in prairies.

When you look at a prairie, you don't see the half of it! That's because most of the prairie is actually living under the ground as a root structure. Why have prairie plants adapted this kind of strategy? Well, just like cranes, plants have special adaptations that help them to survive:

FIRE...

Set by lightning and Native Americans, **wildfires** often swept through the Midwest's prairies. While plants with most of their growth above the ground fared poorly, the large roots of the prairie plants were protected. After the fire, the prairie plants simply would put up more stems and leaves.

WEATHER...

At one time, prairies stretched from the Great Lakes to the Rocky Mountains. This mid-continent area is usually exposed to intense heat in the summer and extreme cold in the winter. Having the majority of the living portion of the plant underground helps to insulate it from these temperature extremes.

NUTRIENT CYCLING...

Fire and herbivores return nutrients trapped in dead stems and leaves to the ground as ashes and manure. As the nutrients move into the soil, they are absorbed into the roots of plants to fuel new growth.

GRAZING...

Large animals called **herbivores**, like bison and elk, ranged the prairie, grazing and browsing on the lush vegetation. But smaller herbivores, like grasshoppers, also ate large amounts of grass and other plant leaves. The constant cropping of the vegetation caused the plants to grow more quickly. But the plants could only do this if they had a large root system and food reserves below ground where these animals could not reach!

SOIL...

Some prairie soils contain a lot of sand and other coarse material. This soil does not hold water very well, so water seeps down deep into the ground. Deep roots, some as long as 18 feet, ensure that prairie plants will be able to reach water. This is especially important during times of **drought**, when plants with smaller root systems may die.

Where Have All the Prairies Gone?



In some ways, prairies are very similar to wetlands...both are communities which were damaged or destroyed after Europeans settled in the Midwest. What did these settlers do to change the prairie? To find out, pretend that you are a new settler just arriving in Wisconsin in 1856. How would YOU react to the conditions you discover?

You and your family need food throughout the summer and also for the upcoming winter. **What would you do?**

Money is scarce on this new frontier. But people in the city are willing to pay for buffalo skins and meat. Some buffalo meat would also be good for your family, and there are a lot of buffalo around. **What would you do?**

Uh, oh. A little fire has started in the back pasture. If the wind shifts it might start burning toward your house. **What do you do?**

Many settlers answered these questions by plowing the land for farms, shooting buffalo for food and hides, and putting out fires before they could burn very much. As a result of their choices, most of the prairie disappeared. Some of it was plowed into cropland. Other areas turned into forests, because fires and large herbivores, such as buffalo and elk, no longer kept the trees and shrubs from taking over.

Did you make the same choices as many early settlers?

Now that you know that those choices will damage the prairie, do you wish you could change some of your answers?

What different choices can you and your classmates think of which would benefit both the prairie and the settlers?

Mix ≠ Match

Match the vocabulary words in the left column with their definitions on the right.

- | | |
|------------------|--|
| ___ Adaptation | a) an animal that eats both plants and animals. |
| ___ Community | b) to look for food. |
| ___ Endangered | c) a change in body structure or behavior that allows a plant or animal to live more successfully. |
| ___ Fledge | d) the distance between wingtips when they are stretched out. |
| ___ Forage | e) an area that an animal "owns" and defends. |
| ___ Herbivore | f) a group of plants and animals that live together. |
| ___ Habitat | g) when there are very few of a plant or animal left. |
| ___ Migration | h) different kinds of plants or animals. |
| ___ Omnivore | i) the place where an animal or plant lives. |
| ___ Staging Area | j) seasonal movement to and from breeding area. |
| ___ Species | k) to grow a complete set of feathers and learn to fly. |
| ___ Sternum | l) land where water is near or above the surface of ground most of the year. |
| ___ Territory | m) an animal that eats only plants. |
| ___ Wetland | n) the breastbone in both cranes and people. |
| ___ Wingspan | o) a place where migrating birds can rest and feed. |

Next, find the vocabulary words in the puzzle on the right.

Can you write a story that uses all of the words?

E N D A N G E R E D S P E C I E S
 X A P S T A G I N G A R E A X Z P
 T F Y W O S S A F W I N G S P A N
 I S C U E A T E O E Z R L M A D A
 N S C O M M U N I T Y B D E L A C
 S H U O E K D B F L E D G E K P X
 T E R R I T O R Y A I H Q A A T M
 E N T A Z B M I N N R A Y K P A O
 R J H S D C N L S D M B X C T T O
 N U L R R M I G R A T I O N E I F
 U V F I Z C V B A M I T F Z B O X
 M Z C E Q A O F J L O A C R I N E
 E Z M H F O R A G E K T U L T T R
 P R O I R H E R B I V O R E Y E D



Well, What Do You Think?

We've learned how cranes adapt, or fit in, to their communities by using their long legs, long necks, and long beaks. People must adapt to the environment, too. Instead of using a beak or a long neck, people can use their brains to think of ways to fit in, and use the land wisely. These questions should start you thinking.

We hope you will learn how to fit into your environment just as well as a crane fits into a wetland.

1. What does being an environmentalist mean? Do you think that you are an environmentalist? Why?
2. A man named Aldo Leopold said that we should care for the soil, water, wildlife, and plants just as much as we care for other people. Do you agree with this statement? Why or why not?
3. At ICF we learn that we have to protect the environment if we want to have good soil, clean water and air, and abundant wildlife. What are two things **you** can do to protect the environment?
4. Your Aunt Gertrude thinks that wetlands are awful places that should be destroyed. Can you convince her that wetlands are important? Be sure to give at least two good reasons.
5. ICF is trying hard to save cranes from becoming extinct. Why should ICF even bother to save the cranes if they are in trouble? Try to think of two reasons.
6. We always have to make choices about how to use the land. Which of these choices would help us adapt to the environment better? Circle the one you prefer and explain why:

We're building a new road. Should we put it:

- a) through the wetland
- b) around the wetland
- c) not build the new road

Whew, look at all this trash. Should we:

- a) recycle everything we can
- b) throw it someplace where we can't see it
- c) try to use less stuff in the first place

We just bought a forest, and we need some wood. Should we:

- a) cut some trees and re-plant more
- b) cut all the trees and sell the land
- c) try to reduce the amount of wood we need