



## **Build a Cattail**

**Overview:** In this activity, students will discuss what plants need to survive. Then they will explore and become the different parts of a cattail. To finish up they'll discover different ways that wildlife use cattails.

**Science Content Standards Correlations:** pg 15

**Activity Adapted From:** Build a Tree, Project Learning Tree

**Information From:** Wetland Weirdos, The Wonders of Wetlands

**Grade:** 5

**Key Concepts:** Plants have structures for respiration and transportation of materials.

### **Objectives:**

Students will be able to:

- name what plants need to survive
- explain the different parts of a cattail
- name three wildlife uses of cattails

### **Possible Locations:**

- anywhere on Refuge

### **Materials Provided by the Refuge:**

- photo of cattails
- diagram of a cattail
- pieces of cattail (leaf, stem, "hotdog")
- 20 nametags for different parts of the cattail
- photos of different wildlife that use cattails

## **Time Frame for Conducting this Activity (25 minutes)**

### **Introduction to a Cattail (3 minutes)**

- what people need to survive
- what plants need to survive

### **Build a Cattail (12 minutes)**

- talk about human body equivalent to provide connections
- hand out nametags with cattail parts
- explain different parts of a cattail and build one as you go

### **Discussion (10 minutes)**

- look at the pieces of a cattail
- how wildlife use cattails

## **How this Activity Relates to the Refuge's Resources**

### **What are the Refuge's resources?**

- significant wildlife habitat
- endangered species
- migratory birds
- resident wildlife

### **What makes it necessary to manage the resources?**

- Wildlife may eat or become entangled in trash such as balloons, fishing line and Styrofoam peanuts.
- Loss of wetland habitats for wildlife due to development, such as landfills, buildings, agriculture land, roads, etc makes it more difficult for wildlife to find food, water, shelter and space.

### **What can students do to help?**

Refuge staff acquire and preserve wetland habitat, but we need your help!

- be responsible for your own trash
- reduce, reuse and recycle, decreasing the need for landfills
- never dump anything down storm drains – pollution can contaminate and destroy wildlife habitat
- adopt a wetland or an endangered species
- only take your dog to place they are permitted and keep it on a leash
- keep your cat inside your house; they catch birds
- teach others what you have learned about habitats and endangered species

## Supporting Information About This Activity

### *Cattails*

- Cattails are emergent plants (they stick up out of the water). The part that looks like a cat's tail or a hotdog is the female **flowering** structure, and there is a thinner male structure above it during the early part of the growing season. If you pull the flower apart, you will find thousands of fuzzy white things that blow around. Each one contains an ovary (the thin, tan bulb in the center of the white fluff) halfway up a little stalk. If the ovaries are pollinated (by wind, gravity, insects, birds), they soon become fertilized seeds with a bulb at the tip. Cattails reproduce by seed germination and through use of underground horizontal stems called rhizomes.
- Long, narrow leaves are attached at the base of each plant, overlapping each other and surrounding the stem. The bundle of leaves and stem near the cattail's roots form the **shoot**, the white part of which is edible and tastes a bit like cucumber. If you cut a cross section of the shoot you will see what looks like a slice of a bunch of celery; the leaves overlap each other, making almost a spiral pattern.
- The **leaves** have vertical channels filled with a starchy material that are part of the vascular system of the plant. They contain **xylem**, which transports water and minerals from the roots to the rest of the plant, and **phloem**, which transports food from the leaves to the rest of the plant. If you cut a piece of a mature leaf several inches up the leaf, the cut surface will be D-shaped and will show a honey comb structure that helps strengthen and support the leaves. The leaves are also where photosynthesis takes place, which is the process by which green plants synthesize carbohydrates from carbon dioxide and water using light as an energy source, usually releasing oxygen as a byproduct.
- The **stem** supports the cattail's flowering bodies. It's cross section reveals a pattern of holes that have two functions. The holes in the center of the stem, and some in the individual

leaf blades, are air-conducting vessels called aerenchyma (pronounced air-ENK-a-ma). They transport oxygen down to the roots, since there is little oxygen in wetland soil for roots to take up. Only wetland and aquatic plants have this adaptation. In plants with floating leaves, aerenchyma help make the stem buoyant. The holes arranged around the outside of the stem are water-conducting vessels closely bound with fibers that provide support for the stem.

- Last, the **roots** help anchor the plant in the ground. They also absorb water and nutrients from the soil.

### How to Lead This Activity by Following the “Do, Read, Ask” Teaching Format

#### *Introduction to a Cattail* (3 minutes)

##### **Do**

Have students sit down in front of you.

Note that this activity is based on a group of 20. For smaller groups you'll have one stem, one flower, then have one or two groups of xylem, phloem and leaves (so it could be three or six students), then disperse the rest of the nametags evenly among shoots and roots.

##### **Ask**

**? What do people need in order to survive?**  
(They need food, water, air and space.)

**? What parts of your body do you use to get these basic needs?**  
(You use your nose to breathe and your mouth to eat and drink.)

**? What about plants, what do they need in order to survive?**  
(Plants need food, water, air, space and sun.)

##### **Read**

“Plants can't move around like you, me and the rest of the wildlife to get their basic necessities, so today we're going discover how plants meet their basic needs by exploring the different parts of a cattail. Plus, to help you remember the

different parts, we're going to compare them to the human body."

**Build a Cattail** (12 minutes)

**Do**

Have the plant part nametags ready and pick a 12 by 12 area where you will build your cattail out of students.

**Ask**

**? First, let's start with the cattail's lungs. What part of a cattail do lungs represent?**  
(Stem)

**Read**

"Since a cattail's roots are underwater, they have a special adaptation that allows them to get air from their stem and then transport it down to their roots through a pattern of air-conducting vessels."

**Do**

Pick one student to be the stem. Give them the nametag that says stem and have them stand in the center of the area you have chosen to build your cattail. Have them read their nametag that gives them instructions on what to say – "I can breathe!" Have them say it once.

**Ask**

**? What do you think a cattail's hair is?**  
(Flower)

**Read**

"A cattail's flower looks kind of like a cat's tail or a hotdog. When the seeds in the flower are ready to make more cattails they use the wind, gravity, insects and birds to germinate. That's when you see all the cattail fluff blowing in the wind, like your hair on a windy day. Once the seeds are fertilized they'll land on the ground and if the habitat is suitable, a new cattail will sprout."

**Do**

Pick one student to be the flower. Give them the nametag that says flower and have them stand next to the stem. Have them read their nametag

that gives them instructions on what to say – "make more plants." Have them say it once.

**Ask**

**? Next, we're going to look at a cattail's leaves, but first we have to start with what is in the leaves. What do you think a cattail's veins are?**

(The xylem and the phloem)

**Read**

"A cattail's leaves house the xylem and the phloem. The xylem transports water from the roots to the rest of the plant. The phloem transports food from the leaves to the rest of the plant."

**Do**

Pick two students to be xylem and two to be phloem. Give them the nametags that say xylem and phloem and have them stand in pairs (one xylem and one phloem) around the stem. Have them read their nametags that give them instructions on what to say and have them say it once. Xylem first – "transport water," then phloem – "food to the plant."

**Ask**

**? So if xylem and phloem are veins in the leaves, what do you think the leaves would be in a human body?**  
(Arms and hands)

**Read**

"Leaves are the vascular system in a cattail, which means they have vertical channels that contain the xylem and the phloem. Leaves are also where photosynthesis takes place."

**Ask**

**? Can anyone tell me what photosynthesis is?**  
(Photosynthesis is when plants make carbohydrates from carbon dioxide and water using light as an energy source, and then releasing oxygen as a byproduct.)

**Do**

Pick two students to be the leaves. Give them the nametags that say leaves and have them each stand by a pair of xylem and phloem. Have them read their nametags that give them instructions on what to say – “we make food.” Have them say it once.

**Ask**

**? Now that we have the top of our cattail, what does the cattail use as legs to hold itself up?**

(Shoot)

**Read**

“The cattail’s long, narrow leaves are attached at the base of the plant, overlapping each other and surrounding the stem. This bundle of leaves and stem form the shoot. If you look at the cross section of a shoot it makes a spiral pattern.”

**Do**

Pick six students to be the shoot. Give them the nametags that say shoot and have them form a circle facing the plant, sit down, and then hold hands. Have them read their nametags that give them instructions on what to say – “I support.” Have them say it once.

**Ask**

**? All we have left for our cattail is its feet, what do you think a cattail’s feet are?**

(Roots)

**Read**

“The roots help anchor the plant in the ground. They also absorb water and nutrients from the soil, and then the xylem takes the water and the nutrients to the rest of the plant.”

**Do**

Pick six students to be the roots. Give them the nametags that say roots and have them form a circle around the shoot, sit down facing away from the stem, and then stretch their arms and legs out. Have them read their nametags that give them instructions on what to say – “absorb water and nutrients!” Have them say it once.

**Read**

“Now that we’ve built our cattail, let’s hear it all together. We’re going to chant our parts three times. Ready?! One, two, three, go!

...

“OK, now that we’ve worked so hard on building our cattail, a muskrat came along and used its teeth to cut us down to use to build his home...at least we were put to good use.

“Hand in your nametags, and then we’ll take a look at a diagram of a cattail and then pieces of an actual cattail.”

**Do**

Collect all the nametags and get the pieces of cattail out. Don’t start passing them around yet.

*Discussion* (10 minutes)

**Do**

As you talk about the different parts of the cattail point them out on the diagram.

**Read**

“Now that we’ve made our own cattail, let’s look at a diagram of a cattail. Who was the stem? This is the part of the cattail that you represented and if you look at the cross section you can see the air-conducting vessels.

“Who was the flower? This is the part that you represented and you can see here the individual seeds.

“Where are my xylem and phloem? You were in these leaves, but if you look at this cross section this is the part that you represented.

“Alright, who was the strong supporting shoot? You’re right here and if you look at this cross section you can see the spiral pattern I mentioned earlier from the leaves wrapping around each other.

“Last, we have the roots. Who absorbed water for our cattail? You’re right here on the diagram.

“OK, now let’s take a look at pieces of an actual cattail. First we have a cross section of the stem. I’m going to pass this around and take a look at the inside of the stem; can you see the air-conducting vessels that allow the plant to get air down to its roots?

“Second we have the flowers of the cattail. There are actually up to 200,000 seeds crammed into this flower! Can you imagine being the one to count all those seeds? I’m going to walk around with the cat’s tail and the seeds (*Leave the seeds in the jar or they will go everywhere*). Only use one finger to touch each one of these and be gentle please. Compare how the two feel; what do they feel like?”

**Do**

Walk the flower and the seeds around the group.

**Read**

“Some say that the flower feels like rough velvet and the loose seeds are fluffy like a cloud.

“Last we have a cross section of the leaf. I’m going to pass this piece around and take a look at the inside of the leaf; can you see the vertical channels? Also notice that it’s in a D-shape, this helps strengthen and support leaves.”

**Do**

Once the cattail pieces have made it around the group, collect them.

**Read**

“Now that we’ve built our own cattail and looked at an actual one, let’s talk about how different wildlife use cattails.”

**Ask**

**? I already mentioned one way that cattails are used by wildlife. Can anyone remember what it was?**

(Muskrats use cattail clippings to build their shelters.)

**? Muskrats aren’t the only wildlife that use cattails for shelter. What other wildlife do you think finds shelter in cattails?**

(Red-winged blackbirds build cup-shaped nests using reeds, cattail leaves and other plants.

Marsh wrens actually weave a ball-shaped nest right onto some cattail stalks.

American bitterns also like to hide among the cattails. When predators come near, the bittern will actually freeze and stretch its neck into the air and rely on its camouflage (coloring that helps wildlife hide) to blend into the cattails.)

**? Some animals eat parts of the cattail like the roots, shoots and seeds. What kind of animals do you think eat parts of the cattail?**

(Ducks, geese and even moose - but you won’t find any moose here!)

**Read**

“While you’re out at the Refuge today keep a close eye out for wildlife around cattails and see if you can find any of them putting the cattails to use.

“Any questions?”

**Do**

If you’re the last group to use this activity gather all the materials and bring them into the visitor center or to the Refuge staff member that was helping your group. Thank you!