



WETLAND PLANT ADAPTATIONS

Wetlands are a challenging place to live! What specialized structures do wetland plants have that allow them to function and survive here?

LESSON AT A GLANCE

GRADE LEVEL

- 9th - 12th grades

CORRELATING STANDARDS

- SC.HS.7.2.C
- SC.HS.10.5.D & E
- SC.HS.10.5.C

ACTIVITY TIME

- 5-10 min - Warm Up:
 - Wetland Challenges
- A Few Weeks - Main Activity:
 - Research Project

MATERIALS

- Wetlands of Nebraska Outreach and Education Guide
- YouTube Channel with wetland videos:
<https://youtu.be/mwcwnSNwqBM>
- Resources to research Nebraska Wetland plant species
- Access to natural resource professionals as needed
 - Contact
ngpc.wildlifefeed@nebraska.gov
- Materials as needed by students for projects

INTRODUCTIONS

Wetlands are unique aquatic ecosystems in Nebraska. The plants that live there have amazing adaptations that allow them to thrive! Using their special structures like roots, stems, and flowers they are able to function and reproduce, continuing the cycle of life in wetland habitats.

OBJECTIVES

This lesson was designed to be used in partnership with the video "Wetland Plant Adaptations". The video and lesson will allow students to better understand that many plants can be found in Nebraska wetlands. Students will see that changing environments like wetlands can lead to changes in populations within that habitat. Plant growth can be affected by this phenomena.

As a result of this lesson:

- Students will provide evidence that changes in environmental conditions may result in a change in the number of species.
- Students will understand that wetland plants are unique depending on where they live in Nebraska by taking a deep dive into researching one type of plant that interests them.

BACKGROUND INFORMATION

What is a Wetland?

How do we define wetlands? This type of habitat is made unique by three key characteristics:

1. **Vegetation** - water loving plants adapted to growing in highly saturated conditions grow here
2. **Hydric soils** - soils found here have developed under saturated conditions that limit oxygen (anaerobic conditions), they often carry a rotten egg smell
3. **Hydrology** - wetlands are saturated by water at some time during the growing season (the time when plants are actively growing)

Wetlands in Nebraska include marshes, lakes, river and stream backwaters, oxbows, wet meadows, fens, forested swamps, and seep areas. These wetlands vary greatly in nature and appearance due to physical features such as geographic location, water source, water permanence, and chemical properties. At some points during the year we may find that some wetlands are bone dry while others always contain some amount of water. There are instances where we may come back after a steady rain and the wetland will be filled to the brim with water. Some wetlands receive their water from groundwater aquifers while others are totally dependent on precipitation and runoff. And finally, the water chemistry of wetlands ranges from fresh to saline, and from acidic to basic. These descriptions identify the extremes of wetland characteristics. Nebraska's wetland resources possess these extremes and virtually every combination in between.

The vegetation, soils, and water that make up a wetland provide habitat for the many species found in Nebraska. The plants that depend on these habitats for survival often face challenges while living in such a dynamic environment. Many plant species have incredible adaptations that allow them to grow and reproduce in wetlands, while other species without these specialized structures would not be able to survive as well. Using their unique features these plants are able to function well in floods, droughts, saline conditions and more.

Begin by watching the video Wetland Plant Adaptations found at:

https://youtu.be/rFU21Or_jEo
or scan the QR Code



The Challenges Plants Face in Wetlands

When the Water Dries Up

One thing people don't usually realize is that wetlands go dry. Depending on the year, they might even stay dry all the time. While many plants would not be able to survive without water, there are other species that have adapted specifically to make it through these circumstances. The endangered plant Saltwort lives in Saline Wetlands surrounding the Lincoln, Nebraska area. The salty soil of these wetlands might cause other plants to wither away, but the Saltwort thrives! The succulent-like stem and leaf structures hold in water, much like a cactus does in a desert. Saltwort also has a root structure called a tap root. This single root structure taps deep into the earth, reaching water and nutrients found in the groundwater even when the topsoil is dry and crusted. Though this plant is listed on Nebraska's endangered species list, the Saltwort survives well in these unique saline wetlands found nowhere else in the state.

Lack of Oxygen in Wetland Soils

While not all wetlands have salty soil, many of them do have soils that develop in conditions that lack oxygen. It's one of the qualities that make wetlands different from other habitats. And though plants don't have lungs like humans, they still need oxygen to survive. The cattail is an emergent plant, usually found standing in three foot deep water on the edges of wetlands. It addresses this watery challenge by taking in oxygen at the top of the plant and moving air down its stem to the roots and rhizomes underground and often, under water. It's almost like when humans use a snorkel to breathe while our mouth is underwater! This rigid stem structure also provides the cattail great support when faced with heavy floods or wind. Multiple cattail species can be found throughout Nebraska and are highly adaptive.

Flooding

Nebraska's state tree is the Eastern Cottonwood. When the waters rise in a wetland, plants like the Cottonwood tree are the first to become submerged because they usually grow nearby. Oftentimes, this flooding can interrupt the normal exchange of oxygen and carbon dioxide between the tree and its environment, weakening the tree and making it susceptible to diseases. The impact to the tree is usually determined by how long it is covered with water. However, the Eastern Cottonwood has a strategy - shallow roots! By keeping its roots close to the earth's surface, they are the first to dry out when flood waters recede. While this isn't a total guarantee that they will survive, it certainly does help!

