**Field Trip to a Wetland**

 **Deep Fork National Wildlife Refuge**

**Introduction**

View the Bellringer: “Introduction to a Bottomland Hardwood Wetland within the Deep Fork

National Wildlife Refuge.”

**Oklahoma Academic Standards for Science 2.LS4.1**

 **Make observations of plants and animals in different habitats. Compare the**

 **diversity of life between these habitats.**

**Disciplinary Core Idea**

There are many different kinds of living things in any area, and they exist in different places on

land and in water.

From the video, what are some of the things that live in the wetland of the Deep Fork National

Wildlife Refuge? What are some of the living and non-living things that are part of this

wetland? Are any of these things found in the neighborhood where you live? How about in a

nearby city park or even on your school grounds? If so, please write down which ones.

**Science and Engineering Practice: Construct an evidence-based account of a wetland.**

**Activity:** Create a Poster or Shoebox Diorama of a Wetland

1. Using poster board, markers, crayons, etc. create an illustration of a wetland. Include both living (plants, animals) and non-living parts of the wetland.
2. Construct a three-dimensional model (diorama) of a wetland.

Student to be creative in using household items, small toy animals, photos of animals/plants, illustrations, etc. in depicting their wetland.

1. For their poster or diorama-wetland, the student is to share how each of the parts of their wetland are connected to each other; how they are part of a wetland system.

**Crosscutting Concepts**

Wetlands are composed of many living and non-living things. They are connected; these things

interact with each other. They are part of a **wetland system; they are part of an ecosystem**.

With ecosystems, size doesn’t matter.

While your neighborhood, or school grounds or nearby park aren’t as large an area as the

Deep Fork National Wildlife Refuge, nor have all of the same things in it, your neighborhood or

school grounds or city park are also ecosystems. The plants, animals, soil and water at these

places are connected. They interact with each other.

A final question: do ecosystems change?

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**2.ESS2.1 Compare multiple solutions designed to slow or prevent wind or water from**

 **changing the shape of the land.**

**Recall**

From the Bellringer Video, recall some of the ways that this bottomland hardwood wetland

reduces damage that would otherwise be caused when the Deep Fork River is flooding.

**Disciplinary Core Idea**

Moving water, such as during a flood, can change the shape of the land. Floods also cause great

damage to homes, farms, cities and towns. Floods can threaten the safety of human and animal

life.

**Science and Engineering Practice:**

Describe some of the ways that the Deep Fork National Wildlife Refuge’s wetland protects the

land from flood damage.

1. The roots of trees and other wetland plants hold the soil;
2. As moving water flows into trees, some of the force (energy) of the floodwater is reduced;
3. The wetland is like a tub; it holds some of the floodwater, slowly releasing it into the river after the flood has occurred.

Engineers design dams, channels and levees as ways to reduce flood damage. However,

wetlands, including flood plains, continue to be essential ways of limiting the damage of

flooding.

**Resource Materials:**

For more information take a look at these resource materials:

“Why Are Wetlands Important?”, U.S. Environmental Protection Agency,

[www.epa.gov/wetlands/why-are-wetlands-important](http://www.epa.gov/wetlands/why-are-wetlands-important)

“Wetland Functions and Values: Water Storage and Storm Runoff”, Vermont Dept. of Environment Conservation, [www.dec.vermont.gov/watershed/wetlands/functions/storage](http://www.dec.vermont.gov/watershed/wetlands/functions/storage)

“WOW! The Wonders of Wetlands”, [www.watereducation.org/product/wow-wonders-wetlands](http://www.watereducation.org/product/wow-wonders-wetlands)

**Activity:** Make a model that shows how wetlands reduce erosion. The Wonders of Wetlands activity, “ Wetland in a Pan” serves as an example. [www.fws.gov](http://www.fws.gov)

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**Crosscutting Concepts**

Wetlands and manmade structures can limit the damage of normal flooding. Catastrophic

or “epic” flooding, which don’t often occur, rapidly change the shape and appearance of the

land as they have throughout time.

**4.LS.1.1 From Molecules to Organisms: Structures and Processes**

**Recall**

From the video of the Deep Fork Natl. Wildlife Refuge, remember that there are times when the

bottom portions of these trees are covered with flood water. Sometimes flood waters

remain high for weeks or even longer periods of time. While trees don’t talk, if these bottomland

hardwood trees could talk they’d likely say: “Bring On The Flood!”

**Disciplinary Core Ideas**

Plants and animals have both internal and external structures that serve various functions in

growth, survival, behavior and reproduction.

Plants make sugar (glucose) through the process of photosynthesis.

Plants obtain energy that they need to grow, produce seed and other life processes when this sugar and oxygen are combined during a process called cellular respiration.

Plant roots get oxygen from the soil so that cellular respiration can occur.

It is for this reason that most trees can’t survive long-term flood conditions. Their roots can’t get

oxygen while submerged under flood water.

How do bottomland hardwood trees survive a long-lasting flood? What makes them different

from most other trees? Have you got some ideas? Write them down.

**Resource Information**

U.S. Forest Service, North Central Region: Bottomland Hardwoods- Plant Adaptation

[www.nrs.fs.fed.us](http://www.nrs.fs.fed.us)

Most wetland plants are adapted to soils that may, at times, be saturated.

Though a technical report about bottomland hardwood trees, focus on two adaptations (structures) that are described:

1. Aerenchyma (pronounced A-renkema). During flood conditions, these trees develop special air spaces, called aerenchyma, Aerenchyma form in those portions of the tree’s roots and stem that are above the water. These air spaces bring oxygen into the tree’s root system so that respiration can occur.

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1. Adventitious Tree Roots – these “adventurous” roots form on the tree trunk, just above the water surface. Like aerenchyma, adventitious roots also absorb oxygen from the air, so that the process of respiration can occur.

If you’ve ever seen a potato that started to sprout tiny, white, roots, these are an example

of adventitious roots.

 **Science and Engineering Practice**

Using paper and markers, draw a profile of a tree, including its roots, trunk, limbs and leaves.

Next, draw a horizontal line across the paper to show the surface of the flood water. The line

should go across the trunk of the tree. Lastly, draw lots of long, thin, roots that grow out of

the tree trunk, just above the surface of the water. These are the tree’s adventitious roots. With

your illustration, can you show these roots absorbing oxygen from the air and storing it in the

tree?

Because the adventitious roots are doing their job, the tree’s leaves don’t wither and die during

the flood. The tree leaves continue to photosynthesize, producing glucose for the tree.

Combining glucose with oxygen though the process of cellular respiration turns glucose into

energy; energy that the tree must have to grow, reproduce and to perform other life functions.

**Crosscutting Concept**

Aerenchyma (extra air spaces in roots and stem) and Adventitious Tree Roots, occur when a

bottomland hardwood tree is in flood water. With its roots underwater, the plant needs this team

of emergency specialists to survive. They only show up when needed. Once the floodwater goes

away, the aerenchyma and adventitious roots also go away.