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# Creating an Environmental Placed Based Education at Norris Elementary

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University of Nebraska – Lincoln

Year 2011

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Creating a Environmental Placed Based Education at Norris  
Elementary

Ben Kittrell

University of Nebraska- Lincoln

# Creating a Environmental Placed Based Education at Norris Elementary

by

Ben Kittrell

AN UNDERGRADUATE THESIS

Presented to the Faculty of  
The Environmental Studies Program at the University of Nebraska-Lincoln  
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With the Emphasis of: Geology

Under the Supervision of Sara Yendra and Chris Kiewra

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## **Creating a Environmental Placed Based Education at Norris Elementary**

### **Abstract**

This study is focused on creating a place based education program. Place based education programs provide many benefits at the personal level with the students (PBEEC). The study was completed at Norris Elementary School where the students have access to the “Norris Forest” which is a planted forest with a walk way through the trees. Some of the trees are labeled for the students to identify and others are not. A graph of the unlabelled trees has been included for the students or the teachers to use.

This project incorporates activities that will engage the students in order to teach them more about nature and the environment around them. Trees are the main emphasis of this project. When asking the students what came to their mind when thinking about nature, almost all students said they thought of trees and often it was the first picture they drew. The teaching activities are a culmination of ideas from other sources that have been modified to fit the environment of Norris Elementary School.

The finding of this study showed the benefits utilizing a place based educational program. The students were able to connect personally with the activities, which generated more interest in and better understandings of the goals after each activity. When the students were being taught about the things they had in their own backyard and saw on a daily basis they were better able to connect and understand the concepts involved in the activities.

This paper will provide reasons why a place based educational program is very beneficial for both teachers and the students.

## Introduction

This project utilizes a case study approach to explore the idea of developing a place-based education program to promote environmental literacy among elementary school children. The project primarily focuses on trees as a means to illustrate how children can learn about nature utilizing their school grounds as a resource. The lessons developed will promote further education by providing the students with basic background knowledge and skills they will need in future educational pursuits. The goals of this study are to create a sample program that will help students become more knowledgeable about the environment and become more interested in nature.

With growing environmental challenges, it is important to educate children and improve their environmental literacy. Environmental literacy does not have a single definition. In a simple sense, environmental literacy is how much a person knows or understands about nature. A more complex definition for environmental literacy is the use of knowledge, skills, affect, and participation to better understand the natural and environmental problems and issues (McBeth et al). Currently, environmental literacy is very low compared to years in the past. Studies have shown that the public of the United States has been lacking in environmental knowledge. One example of this is demonstrated by a survey conducted by Coyle in a 2005 article his ten years of looking at environmental literacy. According to this study, one million Americans believe that the ocean is a source of fresh water and over one million people believe that hydro power is the number one source of electricity in the United States (No Child Left Inside | Why Is EE Important. 2010). These numbers illustrate a low level of environmental literacy and show that people are not receiving the basic science and environmental understandings that they should be getting when young. These cases are examples of why it is necessary to teach kids at a young age the basic knowledge about nature and the outdoors.

This project is important for many other reasons. The program is designed to help children learn to be responsible for their actions when outside in nature. The more knowledgeable about nature the children become, I hope they will tell others the importance of throwing trash away in bins or recycling when possible. This will help the students make more environmentally friendly decisions in the future. The program also encourages students to teach their parents the simple environmental concepts they

have learned. This has the potential to influence how entire families view and interact with nature. By encouraging the parents and children to learn about nature together, there is potential to create a positive outlook at the child-parent level.

The primary objective of this project is to increase students' knowledge about the environment through engaging them in nature. In order to accomplish this objective, it is necessary to create site-specific environmental lessons that cost less than a few dollars a day that can be easily used by teachers. Teachers and students will just need to walk outside and look at the trees and use the resources that the trees have provided. By keeping the cost of the resources and lessons low, there is a greater chance that these lesson plans will be used. This project being place based will make it easier for the teachers to teach about subjects they may not feel comfortable teaching yet. I have identified trees that are not marked in the Norris Forest that teachers can use saving them the time of looking them up and trying to identify the trees. These lessons are meant to be easy for the teachers to pick up and be able to interact with the kids. The teachers just need to know their own backyard, the activities will hopefully spark the students interest and engage them.

## **Literature Review**

### **Nature Deficit Disorder**

Nature Deficit Disorder is a problem with people born in the last two generations. The last two generations have seen a dramatic decline in personal connections with nature. Children are learning about forests and all the ecosystems of the world. But it is causing children to know more about the Amazon rain forest than the forest in their own backyard. Schools across the country are dropping the physical education classes and recess, replacing it with subjects to help the kids do well on school comparison tests. Louv found that 40% of American elementary schools either eliminated or were considering eliminating recess from their curriculum. Some schools have the kids earn recess by getting points online that add up to time spent in recess. A few generations ago people didn't have the distraction of today and went outside in their own backyard and walked the forest and gained first hand experience on the land. With the rise in video games and other electronics coupled with schools not taking the initiative to take the kids outside is having adverse effects. The children are not getting the basic knowledge and the benefits of being in nature (Louv, 2008).

Recent studies have found that children of young age and into adolescence spend on average 6 hours a day in front of a computer or TV. The amount of time these

children spend during an average day outside at their free will is around 15 minutes. This amount of time doesn't include times in school when students are required to engage in certain outdoor activities; it only includes times when children voluntarily went outside to engage in activities. Due to this lack of outdoor activity, America has seen a rise in obesity, depression, and multiple attention problems that seem to be correlated to the amount of time spent in front of a TV or computer (No Child Left Inside | Why Is EE Important. 2010).

## **Benefits of Nature**

What are the advantages of interacting with nature? There have been many papers published on this topic that point to the fact that interacting with nature is very beneficial. Numerous studies have found that the integration of lessons with nature improves attention and memory. (Berman et al, 2008: Rita, 2005). In the study by Berman, subjects were to perform memorization tasks until their working memory was exhausted then walk through one of two environments. The first environment was a downtown setting with lots of traffic and little green space and the second environment consisted of parks with trees and nature. After the walk the subjects were given the memorization tasks again. The subjects who walked through natural setting scored higher than those that walked in the more urban setting. The study then took the same people a week later and had them walk the other path they had not walked the first time. Once again the participants scored higher on the memorization tasks when walking through natural settings (Berman, 2008).

Interacting with nature has also been shown to affect children diagnosed with ADHD. Research conducted at the University of Illinois revealed that ADHD was more prominent in children who did not engage in many green outdoor activities. When children were in a setting that was not a green outdoor setting the children's ADHD symptoms were reported as being the highest. When the children were then put into an environment where there was a lot of green and they were truly in nature, their symptoms seemed to subside. The studies showed that some of the best ways to lessen the symptoms of ADHD was to take children outside and do activities in nature. Once exposed to nature the children's symptoms were reduced for the rest of the day (ADHD, Research, Landscape and Human Health Laboratory, University of Illinois, 2010).

Other studies have shown improvements in diverse human subjects when nature was involved. One study found that when proofreading, the participants who went hiking in the wilderness scored better every time. These participants were compared to two groups who went on vacations to major cities or went on no vacation at all (Wells 2000). Another study has shown exposure to nature is related to the pain response. In hospitals the presence of nature in the room or through a window led to fewer requests

for pain medication, and patients often made a faster recovery in the presence of nature (Kaplan 2001). All of these studies indicate that there are positive benefits associated with nature and being outdoors.

## **Nature and Education**

The environmental literacy movement began in 1968 with the idea that schools should be teaching students about the environment. From 1968 to the present, schools are still trying to figure out exactly what to do to best increase the levels of environmental literacy. Schools are considering what should be taught to the student, how the teachers should present these lessons, and at what level the lessons should be taught. In the past years we have seen a rise in the “green movement” which has raised awareness for learning about the environment and has probably aided the environmental literacy movement (McBeth et al).

Learning about nature in the classroom and doing hands-on activities has more benefits than most people think. Research has shown that having an environmental education mixed in with the general curriculum has improved students’ scores in other sciences. When schools began to incorporate an environmental education into the curriculum the studies showed there was a decrease in the amount of discipline teachers needed to manage the children’s behavior. (No Child Left Inside | Why Is EE Important. 2010).

Due to the environmental literacy movement, there has been an increase in the number of programs that are willing to take children outside and teach them about the environment in which they live. Only a few programs have gone national but many have sprouted up throughout the United States. Many programs are locally oriented and operate utilizing grants or money that was donated. The examples described below are two of the many environmental learning organizations in the United States. Both of these programs provide curriculum that was utilized and modified for this project.

Project Learning Tree (PLT) was established in 1976. The organization’s goal is to be on the cutting edge of nature education. This organization was guided by the partnership combining the American Forest Foundation and the Council of Environmental Education. In the 1980’s PLT went global. Canada, Japan, Mexico, Sweden, China, and Finland are just some of the countries that have joined the PLT organization to increase nature literacy. PLT has been growing strong in teaching students about nature. They have published curriculum for grades K-8 which include lesson plans that are easy to follow and have been shown to be very effective.

Some states have also started up their own nature learning organizations. Nature Net is an organization founded in 1995 by the Aldo Leopold Nature Center to promote environmental literacy. The organization is based in Wisconsin and focuses primarily in the south-central portion of the state. Since its beginning, Nature Net has been expanding and taking steps to become state-wide and hopefully national. This organization is run by the help of grants and contributions. The US Department of Education has used Nature Net as an example of community partnerships in education (naturenet.com).

Having a program that is place based is beneficial in many ways. Having students work and learn in areas they see often has shown to enhance their motivation along with increasing the likelihood that they will use what was learned in the future. It has also been shown to have a greater impact on their future of the students. The place based education was shown to increase the likelihood of a lifelong interest in nature (PBEEC). When 4 place based education organizations were evaluated they found positive results. The place based programs were highly valued by the stakeholders. It was also found stakeholder's interest in the place based organizations activities ranged from a variety of people from kids, students, communities and other organizations. Place based educations sparks interest in people because they can associate with what they are learning. Students live, visit, or just pass by the place they are learning about, this makes it a little more personal (PBEEC).

### **Materials and Methods**

A case study is a type of study where you work with a single person or group of people. In this case I was looking at the group of kids who actively participated in nature club on Friday afternoons. Being able to interact with the students I wanted to enjoy and learn from the activities has many advantages. I was able to see what the kids liked doing and what they didn't like. I was there to talk to the kids about the activities and see what they learned once the activity was over. Being able to interact and make the activities fit the kids interest can be very advantageous when learning from the activity.

### **Sampling Methods and Data Collection**

The tools used to teach the students will be the trees and the environment in the area. I have visited Norris Elementary School and have done a tree log of the types of trees present at Norris Elementary. This data can be used to understand where the tree originates and the aspects of the tree that can be used for learning purposes. The data shows that some schools do not have the same levels of diversity in trees and nature as others have. The reason for more or less diversity of trees is based on the location of

the school. Norris Elementary is located in a rural area with large amounts of open space in which to plant trees and allow children to interact with nature. The school has made it one of the main goals to have a forest of trees from all over to expose the students to different kinds of trees.

Some methods used in this study will be surveys given to students and parents asking them if the learning tools and plans made them more interested in trees and the environment. This study will be looking to see if the students are showing any signs at home that they are more interested in nature. This study will also be asking the students how they felt the classes were and if they thought they were fun and exciting while also providing them a valuable learning experience

### **Descriptions of Instruments or Tools**

The information in this thesis comes from numerous outside sources. One source for this project was the Project Learning Tree Environmental Education Activity Guide. This book has many ideas for children involving nature while also looking at a multidisciplinary approach for the lesson plans. This book also contains numerous environmental activities for all age groups. This book provided guidance when developing the activities discussed in this thesis and will be used in a few examples.

### **Activities**

It can be challenging to captivate children's attention while discussing nature. One way to capture the students' attention is to start the introduction to the topic by stating very interesting facts that the students do not know. The students found the facts about honey locust pods as well as the facts about tannin very interesting and sharing these facts really helped to capture their attention. Below are some facts that the students did not know, I was able to use some of these when starting a activity to get the students attention and interested in what they were going to be doing that day.

1.The honey locust tree is one of the most commonly planted trees in Nebraska. Its native range is from eastern Nebraska all the way to North Carolina and down to Louisiana. Honey locust trees are also one of the commonly planted street trees throughout most cities. The hornless version is planted most often within cities for obvious reasons; however, in nature the tree will have many thorns that can grow to up to 4 inches in length or even longer. This tree has seed pods in late autumn that hang down from the tree. The whole pod if picked up and shaken makes a rattling noise. This pod was one of the first toys as the Native Americans lived in this area a long time ago gave their children these pods to play with. Students in nature clubs really enjoyed this fact, and sharing it with them was a great way to captivate their attention.

2.Giant sequoias carry the molecule tannin in their bark that acts as a fire retardant. Tannin is also found in the fire extinguishers that we use today. Tannins have also been shown to have anti-microbial, antiviral, and also anti-parasitic qualities.

3. The tallest tree in the world is called the Hyperion and it measures in at 379.3 ft. This height is hard for most adults to picture so it is necessary to compare it to something that students are familiar with when telling them this fact. One example for comparison is to use the capital building in downtown Lincoln which is 400ft tall. This tree almost matches the height of this building. For the students who are more familiar with the Omaha locations the Omaha skyline can be used as a reference. Hyperion would be the 3<sup>rd</sup> tallest building in the Omaha skyline.

4. The biggest tree by volume is the General Sherman in Sequoia national park. At its widest point it measure in at 36.5ft. To show this to the students it is useful to pace out the distance so they can truly underside how wide the tree is. At one point people were able to drive a car through one of these giants.

5. One of the world's oldest trees is the Bristlecone pine. This tree is approximately 4,844 years old. This tree was alive well before Columbus sailed to America.

6. Some questions are also useful in grasping students' attention. One of these question is where would you store your energy over winter if you were a tree? While many people say in the trunk and twigs, the correct answer is in the roots so that the energy is protected from the cold weather, fire, snow and ice and animals.

7. Is there a way to track a trees growth? Is there a way to track the growth of individual branches on the tree? The answer is yes and that is done by counting tree rings within trees that are standing. There are other ways but this is probably the most well known method. On some trees like maples, ashes, birches, and others they leave behind ring like features that are very close together, and these represent the end of one year's growth and the beginning of the next years. In pines this information can be used to determine how long the tree has held onto its branches.

## **Some of the larger activities that can be done**

### **Dinosaur Tag**

#### **Engage the learner**

Instructors should first see what the students know about the subject of population control. Instructors should ask the students if they know what controls the population of certain animals in nature. Using the animals that live on the continent of Africa, students are able to identify many factors and fully understand these factors. The number of zebra and wilder beast depends partly on the number of lion and tigers roaming around. Another way to view it is by looking at plant populations; the number of grazers has a control over the number of grasses. Instructors should suggest these ideas to the students and see what they already know from their schooling.

#### **Exploring concepts**

Instructors should show a picture that depicts many predators on one side and few prey animals on another side of the paper. Have the students work together to

come up with ideas and the scenario that might play out. Do they think the prey will all get eaten?

Next switch the number of animals. What happens if there are a larger number of prey animals and just a few predators? Will all the prey animals soon disappear? Or will they be able to survive? How will these changes effects of number of each population?

### **Objective**

The planet and all the ecosystems live in a balance. One animal controls the population of another all the way down the food chain. They are all a part of the ecosystem and all have a purpose for being there. If one species becomes overpopulated in an area there may not be enough food to sustain that population at a high amount. This game will help the students learn how populations of one animal can affect the populations of another and what happens if one species becomes extinct.

### **Getting Started**

This activity works best with a large group of students. The students will need to be split into three smaller groups. One group will be the tigers; the other two will be either the woolly mammoths or the tyrannosaurus. The groups have to act out the creature their group is assigned to be. The woolly mammoths will have to appear as big as possible with their arms spread out taking big strides. The tyrannosaurus will have to have their arms shortened by holding them close to their body. The tigers will have to move on all fours like cats would until they decide to attack and they can run on two legs but will need to growl so the other animals can distinguish them from the other groups.

### **The Activity**

The game starts with all three groups picking out a base for their animal so that the bases form a triangle and are about equal distance apart. This will be the base where they bring the animals they capture. The students will need a big area to run around and get the other animals. Once they have a hold of the other animals or tag them then both the predator and prey must walk back to their base together. They can't be captured by others while walking back to the base, and they are safe from all other animals. Once they get to the base of the animal that captured them the one who was captured will turn into the animal that captured them and then rejoin the game as that animal. This game will keep going until one animal is completely gone

### **Rules**

1. Tyrannosaurus will try to capture the tigers.
2. Tigers will capture the woolly mammoths
3. Woolly mammoths will capture the tyrannosaurus.
4. Once one animal is gone the two remaining will capture each other until only one remains.
5. The teams should be about even at the start. In order to show what happens when some animal gets an unfair advantage over the other the size of the groups can be adjusted so that one animal has a greater population at the start.

### **Safety**

Make sure the students are running on a smooth and relatively soft surface, such as a soccer or football field if one is available. This game should not be played near streets, on cement, or in areas with hard ground.

# Seeing the Seasons

## Engage the Learner

To begin, instructors should ask the students if they see the same animals all year round. Then the instructors should ask what animals specifically the students see all year and what animals they see only for a certain time or season. Why do some animals leave the area for certain parts of the year? Also, instructors should ask the students if they know of any adaptations of animals or plants that allow them to stay in one location throughout the year or move to a different location during different seasons.

## Explore the concepts

Instructors should ask the students to write down adaptations they have made to the different seasons. What do they do differently on a yearly basis? Also instructors should see if the students are aware of what causes the seasons to change. Instructors should begin by asking questions such as ask why is there less sunlight in the winter. Then the students should think about why seasons change and what differences they notice about the changing seasons.

## Objective

The seasons are always changing and the flora and fauna are always changing with them. Most of the time these changes happen so slowly that people don't notice the small shifts of birds and animals that pass through. This activity will get the students outside trying to see these changes of flora and fauna.

## Materials

Each of the students will need a notepad for drawing and colored pencils or crayons. If necessary the students may need to use a clipboard for a flat surface to write or draw on.

## Activity

In this activity the students will be drawing what they see in nature. The students will need to go outside and move around to new locations after they have finished conducting their lab notes from the previous area. The student's lab notes will be a culmination of drawings, words, and whatever else they choose to use to describe the plants, animals and sounds that they hear in the different areas. When the students see a butterfly for example they should draw it using the same colors they see in nature. If they see a bird make a sketch of the bird and the colors it exhibited. If the students hear sounds and are able to put the sounds into words this will also work. The children will want to record this data in a field notebook to see what differences they see throughout the year.

In order to get the full effect of the activity, instructors should have the students do this throughout the year approximately once a month in order for the students to see what the different animals, plants, and sounds there are throughout the season. This will use the senses of the students and also enhance their awareness of the changing landscape.

(Some Ideas used from Project Learning Tree)

## Tree Buddy

### **Engage the learner**

This activity is about watching things grow, including trees and the students themselves. Instructors should have the students answer questions like how fast they think they grow, and do you think you grow faster than a tree. Also, instructors should ask the students what trees need to grow and what humans require to grow. Then instructors should show them slides of the tallest people in the world and the tallest trees while comparing the ages of the people and the ages of the trees.

### **Explore the concept**

Instructors should give the students many scenarios and have them come up with things that could affect the trees growth. Instructors should include scenarios in which trees have light hitting their leaves as well as scenarios when trees grow in a pot with light and water. Also, a desert scenario with plenty of sun but little water is also helpful. Instructors should also ask the students how roots affect the growth of trees and whether or not having little room for root growth affects the tree's overall growth.

### **Objective**

Tree buddy will show the students how fast trees grow and change. Most adults won't notice the difference in tree size or shape of the leaves through the season. This activity will show the students that trees can grow very fast and some branches will grow over a foot a year. This activity can also be used in tracking the growth of the children in order to compare them student's growth to the growth of the tree. This will help the students learn how to measure things and use basic scientific equipment.

The tree buddy activity which works best with recently planted trees or with trees which have branches hanging low enough for the students to grab and examine the branches and twigs. This activity will also work best with trees that have leaves and not with needles as the leaves tend to exhibit faster growth that will be more rewarding for the students to look at.

### **Materials**

The students will need colored tape or permanent markers with one sheet of paper or possibly more depending on the amount of trees the students will be looking at. This activity will work best in the spring time when the trees are starting to bloom and get their leaves back.

### **Activity**

The students will need to go outside before the leaves begin to appear on the branches. They will each pick out a branch on a tree that they like and mark where the end of the twig is. They can either use collared tape or they can mark it with a permanent marker if they chose. Students will need to make sure that the tape or the marker goes all the way around the branch.

When the tree starts to open its buds and the leaves begin to appear the students will use their markings to see how fast and how long the branch grew in the time they were watching the tree. Students should track the branches' growth in their notebooks by measuring the distance between the markers they put on the tree to the new end of the branch. Students will need to follow the tree for at least a month and they should check up on it every few weeks if not weekly when the trees begin to put on leaves. After a month or so they can check on it less often as the tree will begin to grow slower than it did in the early spring.

This activity can also be done with leaves and the changing of the seasons. Often trees have leaves of different size depending on the location on the tree and the season it is. Instructors can have the students grab one leaf from the same place on the tree a few times during the year and have them trace the leaf they can easily identify the differences in the leaf shape.

## **Adaptation**

### **Engaging the Learner**

Instructors should begin by having the students come up with ways they adapt to the environment they live in. Why do they wear coat in the winter or wear shorts in the summer? Instructors should then ask the students to come up with ways animals adapt to their environment throughout the year.

### **Exploring the Concepts**

The students will probably be able to come up with many ideas about how humans and animals adapt to certain environments. However, it is unlikely the students will be as familiar with trees' adaptations. How do trees adapt to areas of very high rainfall and how do they adapt to areas of low rainfall? What could a tree do to protect itself from heavy winter snowfall? What other source of food can a plant get than the roots can get? Do plants eat animals?

### **Overview**

Adaptation is going to make the students think about why plants and trees look the way they do and how they adapt to their surroundings. This will make the students think and challenge them.

### **Materials**

For this activity the instructor will need pictures of trees or animals. These can be easily obtained from the internet.

### **Activity**

The instructor will need to gather pictures of plants that inhabit different climate types or biomes in the real world. I have provided examples of some trees and their adaptations to their environment.

### **Some example adaptations:**

#### **Norway spruce:**

Location: High elevations throughout northern and eastern Europe. Norway spruce has many branches that hang down like curtains. This adaptation is due to the very heavy snowfall that occurs at the elevation and natural range of the tree. The snow does not have the surface area to stick to and build up on the branches. This allows very little snow buildup on the branches and therefore not breaking any of the branches. Another more complex example can be seen in the needles of the tree. The needles stay green year round and photosynthesis the best at lower temperatures. This allows the tree to photosynthesize before the broadleaf trees would have their leaves. In the mountains the growing season is very short and they need to maximize the time they can make energy.

#### **Saguaro cactus:**

This is the cactus that most people associate with deserts and arid climates. The Joshua tree would be another example for these climates. The cactus has spikes to protect its trunk or arms from getting eaten by animals. The trunk is the part of the tree

where the water is stored and the tree/plant needs to protect this heavily as water is a scarce resource in the desert. The Joshua tree has leaves that are very thick and sharp at the end. The leaves are very thick to hold onto moisture. The tree often retains the old leaves and lets them hang down protecting it from animals that would want to climb its trunk and get to the leaves.

Some trees like the Baobabs of Africa lose their leaves in the summer during the summer drought. These trees will have trunks that are many feet in diameter. They have such big trunks to store very large amount of water to keep the tree cool and alive during the summer heat. They lose the leaves because the tree will lose too much moisture through transportation so during the summer.

#### **Pine Trees:**

Pine trees like the jack pine and Lodge pole pine keep their cones completely closed until a fire that is hot enough to melt the resin holding the cone together melts and lets the seeds disperse.

#### **Venus Flytrap:**

This is a plant lives in the Carolinas and the soil is lacking in certain nutrients that the plant needs so it has adapted to eating insects in order to gather the nutrients that it needs.

#### **Others:**

Oak trees make nuts that animals like so the animals will take the oak nut and move it below ground somewhere else. Birds, squirrels, and in the past humans would move the nuts all over and serve as the tree's dispersing agent.

Instructors should have the students come up with their own ideas for what they would have if they could to protect them from whatever they want. The students can then cut out and tape on them the defenses they come up with. For example, if the students want spikes you could cut pieces of paper that resemble spikes and tape it to their clothing. If they want to be a big tree and hold lots of water have them put on a giant coat in which they can carry many things. Instructors and students should both be creative in creating these adaptations.

At the very end of this activity a game called Plants vs. Flies can be played with the students. This game involves splitting the students into even teams of two. If the students have a large age range it may be necessary to split the students into groups of similar ages. The game requires a large space depending on the amount of students. It is also necessary for the instructors to supervise the flies so that they don't run into anything and to tell them when they have reached the finish. For safety reasons, the instructors need to make sure that there is no walking or jogging during this game.

The object of the games is to have the "flies" which will be one group of students make it to the other side of the area without being grabbed by the "plants." The flies will be blindfolded or they will just have to close their eyes as they try going from one side to the other.

The other team of the "plants" or the Venus fly traps will decide where to stand inside the designated area. The plants cannot move around as their feet are roots anchoring them to the ground. They cannot form a line of traps, and they need to be scattered at random. Their goal is to capture the flies when they get close to the traps.

They can wrap their arms around the flies or just tag the flies to catch them. Once caught, the flies can then open their eyes and wait for the rest of the game to finish.

## **Tree Dispersal**

### **Engage the learner**

Instructors should ask the students if they know all the ways trees disperse their seeds. Instructors should see if the students know the main two methods of propagation by squirrels and the wind. Also, instructors can ask if the students know the primary trees that disperse in this method. Oaks are mainly dispersed by animals like squirrels. The Kentucky coffee tree and the eastern red cedar are two more commonly planted trees which use animals as their disperser. Almost all spruces and many pines are distributed by the wind. These will be the evergreen trees in the area.

### **Explore the Concept**

Instructors should gather pictures from different surroundings. For example, instructors could include a picture of the mountains, and then ask the students which method would favor a tree in this particular environment. Since there are few animal dispersers in the high elevations, trees in these regions tend to use the wind. Instructors should next show a picture of a valley where the wind might not be as high but animal populations are high. This would be a temperate or tropical location. It is important for the instructors to have the students think about why these different methods are used in certain environments. A couple of trees, such as the lodge pole pine and jack pine use fire to spread their seeds. They have serotinous cones that only open when fire melts the sugars and allows the cone scales to open and the seeds fall out. For this instructors should show the students trees on fire and the post fire ecology. Instructors should also try to make the students come up with advantages of post fire re-population. Some of the advantages include that the fire clears all competitors so the tree have a higher success rate, and the fire, through decomposition, will put nutrients back into the soil to be used by the seedling.

### **Overview**

Tree dispersal is an activity to teach the students about the methods that trees use to disperse of their seeds. This game is one that can be played in the fall when the trees seeds are ripe and ready to be dispersed. This activity will need to be played outside giving lots of room to move and run around. It should not be played right next to a building as the wind speed could too low for the activity.

### **Materials**

At the start of this activity the students should grab at least two different kinds of seeds. The two best are oaks and maples as they have two different methods of transporting seeds. The oaks are dispersed by animals carrying them to a different location and the maples rely mostly on the wind for dispersal.

### **Activity**

This activity can start with seeds already gathered and is best conducted on a windy day. The instructor will then place the items on a table and instruct the students to move the acorns. Depending on how many acorns and how many students are participating, the students may have to be in teams and have multiple people decide where to put the acorn. Instructors should have the students think they are squirrels and

hide the acorns around the area so that other groups will not be able find them. Once they are done hiding the seeds have them return back to the table.

Now the instructor should split up all the maple seeds that have been collected and have them throw the seeds into the air keeping their feet on the ground and standing in one spot. Once they have thrown the seeds into the air they can throw them up as many times as they want until they can't reach anymore with their hands.

Once the students have completed these two steps the instructors should ask the students these few questions:

1. Which seeds traveled farther from the parent tree (where they started the experiment)?
2. What are some advantages of seeds traveling farther from the parent tree?
3. What are the disadvantages from being close to the parent tree?
4. Where might wind dispersal be better than animal dispersal?
5. Where might animal dispersal be better than wind dispersal?

Some answers instructors should be looking for in the student responses are:

1. They should have noticed that the acorns of the once dispersed by them walking around traveled farther.
2. The seeds farther away will have less competition from the parent tree for water and sunlight. They will also be spread faster allowing the species to spread farther faster. Animals will typically bury the seeds which keep the seed warmer and give it a better chance of germination.
3. The parent tree can take the sunlight. The parent tree will use up all the water and nutrients available for the seedling.
4. In high elevation or areas where its very cold. The mountains are good because up top there are few animals to disperse your seeds. These areas typically have very windy conditions that can move the seeds very far.
5. Areas where the canopy is very dense and full of trees will not be a good place for wind dispersal. The other trees will intercept all the wind and create still conditions.

## **Being a Tree**

### **Engage the Learner**

Instructors should ask the students what are the three main things tree need to survive. They should answer water, sun, and nutrients. While different amounts of each will affect the tree differently this may be more complicated to get into during this activity.

### **Explore the concepts**

These three different components affect tree growth. If one is lacking the tree will slow its growth or make dramatic changes. Instructors should see how much the students know about this topic and see if they know all the reasons for trees dropping their leaves, whether in summer or winter. Instructors should ask the students how tree growth might be affected by low nutrients, if the tree's roots need to breathe, what can happen if the trees get to much or little water.

For example in the winter here in Nebraska, the trees lose their leaves due to freezing of the leaves but also because the cost to maintain the leaves with the decreasing sun light is more than they will get out through photosynthesis. An African Baobab will lose its leaves in the summer dry season to conserve water. Trees in nutrient poor environments will show stunted growth and greater use efficiency of the nutrients. With too much water the roots can drown and die. The roots also need to breath and respire.

### **Overview/Background**

This activity can be used to show the students what trees have to deal with everyday. Trees need three main things in order to survive and thrive in their environment. The first of these is sun which they need in order to photosynthesis and create the sugars needed to run the tree. The plants need water in order to cool them down and aid in photosynthesis. Nutrients are necessary as they enable the trees to grow and create wood.

### **Materials**

Instructors will need pieces of paper that are three different colors to distinguish between the three things trees need: water, nutrients, and sunlight. Ideally, instructors should use yellow for sun, blue for water, and green for nutrients. Instructors should cut the paper into squares or circles about 3 to 4 inches in diameter. The amount that is needed depends on the amount of students taking part in the activity. A good rule is to have 3 of each resource per student.

### **Activity**

For this activity instructors should have the students stand in a designated area. Preferably the students will not want to be farther than 3 feet apart from each other so no students are isolated from the group. Then the instructors will distribute the resources (water, sunlight, nutrients) evenly in the playing area. The students will not be allowed to move their feet but they can move their arms to gather the resources. There are two ways of playing the game. The first method is ideal for younger students.

### **Way #1**

Once all the resources are set down and the trees (students) are in place the game can begin. The game will last 30 seconds and during this time the students are to grab as many resources as they can. Once the 30 seconds is up instructors should have each students count how many resources they have.

Next, instructors should have the students come closer together than they were in the first round. A good amount would be to have the students 1.5 feet apart. Instructors should then spread out the nutrients again and give the students 30 seconds to gather as many as they can. The students will again count the number that they had. They should notice that some people had more nutrients and some had less. This is to show that when trees are all close together and competing for the same things some will get advantages over others and those will be the trees that grow big and tall. Also instructors should have half the students real close and the other half be farther apart to also show how close the trees are changes the competition among the trees.

## Way #2

This way will be similar to the first but slightly more complicated. The game will start the same way as the first method but there is no time limit. This way will go in rounds. Each round requires the students to gather one of each resource; they can't grab more than one of each type per round. The rules work as follows.

1. Each tree must grab a blue resource every round. This is water and if the trees dry up they cannot survive. If they fail to do so they will be eliminated.
2. The trees cannot go two rounds without picking up sunlight. If they fail to do so they will wilt and be eliminated from the game.
3. The trees can't go 3 rounds without picking up a nutrient card. Failing to do so will have them eliminated for the game.
4. If any tree fails to meet one of these requirements they will be eliminated. Once eliminated they will throw their cards into the air having then fall where they lie. These resources will now be available for other trees to pick up.
5. If an individual tree has 3 of each resource they are allowed to take a step with one foot. They can now reach farther than they could with their feet together. This is showing that the trees have grown and its roots are farther spreading from the tree. This allows it to get resources it was not able to before. They cannot pivot on either foot; they must both remain planted once they have moved one foot.
6. If a tree gets 5 of each resource it is allowed to pivot on its original foot spot. This means that the students can rotate in circles without picking up their original foot at the start of the game. This is showing again that the tree has grown and can get resources from even farther now.
7. The game will continue until no trees are left or few remain.

The second game shows some similar ideas as the first but in a little more complicated way. Once a tree dies it opens up the canopy and allows sunlight to reach surrounding trees better. As the tree gets decomposed the nutrients get deposited back into the soil. Water that falls where this tree used to be is now available for other trees in the area. This way gives them a little more complicated way of thinking about forest and the way they work.

(Some ideas used from Projects learning tree)

## Tree Rings

### Engage the learner

The students probably know what the tree rings mean. Each ring is one year's growth of the tree. However, it is unlikely the students will know how many rings a tree can put on in its lifetime. Instructors should ask if the students know that not all trees create tree rings. Trees that live in habitats that don't really have seasons, such as the tropics near the equator, will sometimes not have tree rings as their growth will be continuous all year long.

### **Overview**

This activity is to show students the significance of tree rings and fun ways to get the information across. The students will construct their own ring of life and write down what they did during that year of growth.

### **Materials**

Using paper plates works best for this activity. Regular paper can be used. The students will also need coloring utensils.

### **Activity**

How this activity is conducted depends on the amount of time available for the activity. The short way will have the students draw rings on the paper plate to simulate tree rings and write or draw in the space or another piece of paper what they did that year. The longer one works well if they will be in contact with the kid for many years and be able to keep it for them as they go to different grades in school.

### **Short way**

Instructors should hand out to each of the students one paper plate and coloring utensils. Instructors should then have the students draw circles on the plate representing the tree rings. Students should then label the years of the rings. Once this is done tell them to draw pictures of anything they can remember doing that year of their life. If some are very young and can't remember have them draw rings for the future going as far as they would like and have them draw pictures of what they wish to be doing in that time of their life. This will get the students thinking about the past and the future with what they want to do or wish they will do. This activity will also help the teachers or leaders understand the students better and know what they aspire to be.

### **Long way**

This way works best if you start this activity when the children are as young as possible, such as kindergarten or first grade. For this activity the students will need a large piece of paper about 2-3 feet in diameter. This paper can be any shape. Instructors should have the students draw circles for the years before up till the age they currently are. In these spaces they can do the same things as the short method suggests. On the tree ring representing the age they are now the students should record their current height. This will be used as a guide down the road. Once this has been done for all the students and they have finished coloring what they wanted store these in a place where they can get them for future use.

The next year give these back to the students to look at. The next step is to re-measure the students and see how much they have grown. If they have grown 3 inches from last year make the width of the next tree ring 3 inches. Then the students should draw in the designated area pictures of what they did in the year past in summer and during the school year. The students might need help drawing in the tree ring so that it's 3 inches bigger in all directions. It may help to have the teacher measure 3 inches from the old line in all the directions and make dots several times over. Then have the students connect the dots which will make a circle the size that they needed.

This activity can be repeated over many years and also keep track of the students' growth. This will also help the students recall things they did that year. This

activity will provide the students something to look back on when they get older as a reference of how fast they grew and what they did when they were students.

(Some ideas used from Project Learning Tree)

## **Results**

The results for this paper were gained by having the students participate in some of the activities and gauging their reactions. The main criteria for determining the results from these activities were:

1. That the students had fun.
2. The students learned something from the activity.
3. The students were able to bring the ideas learned in Nature Club and apply them in different areas of study.

When running these activities with the students it became clear that the activities did not need to be very lengthy in order to engage the students. Doing small, simple things was almost just as effective as having the students participate in elaborate activities. It was necessary to grasp the students' attention early on in the activity, and one of the best methods for doing this was to tell the students a few fun, interesting facts about the trees. The students were most responsive to this when they could see the tree or be in the Norris Forrest while being told about the trees. The students seemed to understand the facts better when there was some sort of visual representation. For example, when discussing the diameter of some of the sequoias, the students went outside to the playground and measure the actual distance of the trees and then line up side by side to see how many students it would take to be as wide as the tree. The students really enjoyed this, and they all were amazed. Little things like this can have a big impact on the student's attention and help to keep them more interested in the activities. The key is to have the students interact and to present the information in a manner that is personal to the students.

When doing the activity called "Being a Tree" the students met the three criteria of the activities. The students showed great enthusiasm for the activity. The activity was run through the faster way due to time constraints. The nutrients were spaced out evenly over the playing area, and the students chose a spot to stand. The students then tried to grab as many nutrients as possible. After the students had gathered most of the nutrients they then counted how many they had collected. After they had counted the nutrients, the instructors asked the students why some had gathered more nutrients than others. The students were able to identify that the students who were the most crowded received the least amount of nutrients. They also noticed that the "trees" who were on the edges got more than the "trees" that were in the center.

The second time the students participated in this activity the nutrients were spaced out evenly and the students were instructed to stand wherever they wanted to. The students this time used the knowledge they had attained for the first run through of the activity and started to space themselves out and show some competition for the most favorable spots. If there was an area that had more people they tended to want the outside edge of the grouping. The students then gathered all the nutrients that they could and once again counted what they had. The results were just as expected, and the students in open got more nutrients than the students that were close together.

After this activity the students were able to integrate this knowledge with ideas of other topics. This activity was a very good activity and the kids were very engaged in the activity which helped them to clearly learn the objectives of the activity and better understand competition and spacing amount trees in nature.

The students were also given the opportunity to see many of the local trees in Norris Forrest during Nature Club. The students learned how to identify pine trees from other deciduous trees and what keys to look for when identifying trees. The students looked closely at the tree and examined it paying close attention to the details of the tree, more specifically how many needles there were per bundle of the pines. The students showed lots of interest and enthusiasm when they were able to examine the trees in detail. They began to notice that trees were very different and that not all pine trees were the same. Some of the students began to go around to other trees and look at them trying to find differences among the other trees in the forest. This simple, engaging activity created a lot of interest among the students and also allowed them to learn in a manner that they found very fun and exciting. They took this knowledge with them and told some of the other students who did not participate in the activities about what they had learned.

Further results will be coming soon as data comes back from other sources.

### **Discussion**

This paper through some of the results of the activities shows that students are truly interested in nature. This interest in nature can not only be used to teach them about the environment but can be utilized to teach students about other subjects. The activity “Being a Tree” was used to help the younger students count, and the same activity was used to teach the older students about how competition among species occurs. The concepts of competition can be used in many scientific disciplines, and teaching the students in this manner was far better than just telling the students about it in a classroom. The students need to be engaged and have fun. If these two conditions are not met then the students will learn more because they will be more engaged and

better understand the concepts. The students having the most fun were the students who gained the most knowledge from these activities.

This activity also made a personal connection with the students, as they see these trees on a regular basis. This will hopefully allow them to better retain the information they learned through these activities. Having this personal connection is invaluable as it enables the students to go outside, see what they learned, and apply it in their own backyard.

Overall, this student was a success as it increased the students' interests in nature. Hopefully this spark of interest will remain with the students for a long time and increase their desire to learn about nature for many years in the future.

## **Summary and Conclusions**

### **Overview**

This study was conducted at Norris Elementary School and focused on creating a place based nature curriculum. The goal of this study was to provide teachers and faculty with the tools they needed to teach kids about nature and the "Norris Forest" at the school. The activities were designed to require as little preparation as possible to increase the likelihood they would be implemented into the curriculum. The objective was to have the students show a greater understanding of nature and more specifically trees. The hope for this project was for the students to have a greater interest in nature and carry these ideas home with them and to use them growing up.

This study was done to hopefully bring more nature activities into the curriculum at Norris Elementary. This school has an excellent source of a diverse grouping of trees that, if utilized correctly, will be beneficial for both students and teachers alike. Currently, students are not being taught about nature as they were a few generations ago. Students and adults have lost the personal connection with trees. We no longer spend time outside or even really get to know our own backyards. Learning about nature as shown above improved students' abilities to remember or retain information and to suppress symptoms of ADHD. There is probably even more benefits that have not been written about in the literature. The activities in this study helped create a personal connection between the students and the trees and nature that they have at their own school. The students see these trees daily which makes them great tools for teaching the students about nature in a fun and exciting way. Thus, it is highly probable that in the future when the students see the trees they will remember the information taught to them through these activities and the ideas will be reinforced. Having a place based curriculum is a very good source for the students. Once again it is that personal

connection with what they are learning about that makes this study better than one designed to fit many places in the United States.

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