CREATING A CULTURE FOR OUTDOOR ENVIRONMENTAL EDUCATION IN AN
ELEMENTARY SETTING

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of Arts in Education: Natural Science and Environmental Education

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**Project Summary**

This Capstone Project is an attempt at engaging more staff to utilize outdoor resources, of their school, in their teaching. I teach at a school that has a 12 acre nature center that rarely sees use. Learning the many benefits of outdoor environmental education, I want to see more students exposed to the outdoors. I realize that a change in mindset needs to happen amongst the staff in order for this to happen. Staff are the sole reason the nature center sees little to no use, staff need to be deliberate in their planning and include opportunities for outdoor education. After a short staff survey, in attempt to understand the underuse, it became apparent there were needs to be met if I wanted to see more staff teaching outdoors. The survey helped identify barriers, real and perceived, restricting staff use of the nature center in their teaching. Major barriers for staff included time, high stakes testing (math and reading), and lack of environmental knowledge. However, most staff (70%) indicated the high importance of outdoor environmental education. This learning led me to question, *how do we make meaningful outdoor environmental education something that all teachers can provide to their students?*

Discussions with my building administrator encouraged me to focus in on one grade level that we believe would take advantage of the opportunity to use the nature center more often. We also agreed that by gathering the right activities and offering support this grade level could be the start of an environmental movement in our building. I centered this gathering of lessons and activities at a 3rd grade level, but it shares many standards with other grade levels and can easily be adapted for other elementary grade levels. Similarly, the materials assembled, crafted toward the nature center adjacent to the school I teach, can easily be used at many other locations and school sites.
In an attempt to eliminate barriers teachers felt limited their use of the outdoor setting I have collected lessons and activities that require limited materials, limited preparation, are highly engaging, require little background knowledge, and meet state academic standards in math, reading and science. This project is designed to encourage third grade staff to include outdoor environmental education in their lessons and eventually become independent. Using research gathered and outlined in Chapter Two, I have gathered, adapted and modified ten lessons/activities to be used in the third grade. The lessons were selected to meet the need to eliminate barriers to teaching outside. Lessons and activities were selected to meet the needs of young learners by meeting academic standards and the need for environmental exposure. There are 5 lessons in the Fall, 2 lessons/activities in the Winter, and 3 lessons in the Spring for teachers to execute. There are ten lessons/activities in all. Activities for other grade levels will be added at a later date. This creates many opportunities per school year for teachers to engage in the natural setting of the outdoor classrooms and nature center providing experiential outdoor learning for students while still meeting rigorous academic standards in math, reading, and science. Activities and lessons are designed to be inviting and flexible for the teachers. Hopefully by providing easy to follow activities, teachers will be comfortable outdoors and barriers will be eliminated. The goal of each activity is to welcome and encourage teachers to use the nature center and solicit a return visit. By doing this, those experiences in the outdoors will resonate positively with the students. This project is set up with a total of ten activities for 3rd grade students. At a later date lessons for additional grades will be gathered, created, and aligned. Future lessons and activities will be rotated in and out annually to keep the learning up-to-date, fresh, and exciting for students while meeting the demand for standards aligned activities.
There are many resources out there for teachers who wish to incorporate environmental education into their lessons. For this project I found that the activities offered by three sources were best adaptable to my setting with the easiest preparation to achieve the goal of my project. Some lessons and activities were adapted from both Project Learning Tree and Project WILD. These are excellent resources and offer a cash of additional activities for the future. In my research I was able to locate an excellent resource in Nature Seeker Guidebook by Lawrence Wade, a local author. Many of the lessons and activities I have chosen have been modified or been taken directly from his book. His activities and lessons are an excellent fit this project due to his expertise and knowledge of local environment. Larry Wade has been a great resource to assist with this project.

With a short professional development, consisting of just the third grade team, and access to the ten selected lessons, it is my hope to see the start of a push, by staff, to use the nature center and offer opportunities for students to grow academically and become more aware or the natural world and their place in it. Outdoor environmental education has many benefits for all, staff, students, families and community. It is our job to provide opportunities that invest in these benefits.
# Journal making Activity – adapted from Project WILD

## Desired Results

<table>
<thead>
<tr>
<th>Established Goals:</th>
<th>Essential Questions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science 3.1.1.2.3 Maintain a record of observations, procedures, and explanations, being careful to distinguish between actual observations and ideas about what was observed.</td>
<td>-How do naturalists use their journals to document their observations, ideas and drawings?</td>
</tr>
<tr>
<td>Reading 3.6.10.10 Write routinely over extended time frames (research, reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline specific tasks, purposes and audiences</td>
<td>-How can my journal connect me to the natural world?</td>
</tr>
</tbody>
</table>

### Understandings:
Students will know that…Naturalists are people that studies nature through observation and interaction with nature. Naturalists often collect their idea, observations and drawings in a journal.

### Essential Questions:
- How do naturalists use their journals to document their observations, ideas and drawings?
- How can my journal connect me to the natural world?

### Students will know…
Their journal is for them to document their 3rd grade nature center learning as naturalists.

### Students will be able to…
Maintain a record of lessons and visits to the nature center throughout the year.

## Assessment Evidence

<table>
<thead>
<tr>
<th>Performance Tasks:</th>
<th>Other Evidence:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will create a nature center journal to be used for the 3rd grade year. -Students will demonstrate the procedure for creating a new entry.</td>
<td>Students can write poetry, create narratives or sketch drawings to reflect their learning from each activity or trip to the nature center.</td>
</tr>
</tbody>
</table>

## Learning Plan

### Learning Activities:
Providing 25 pages of white copy paper and one 9x12 piece of construction paper, assist students in creating a nature center journal for the school year.
- Students that are finished assembling their journal may design a cover for the front.
- Demonstrate how each entry begins
- If time allows take a hike to an outdoor location an allow time to make informal observations.
- Return to the classroom to share findings and learning, posting/sharing specific student examples.

Template adapted from Understanding by Design, written by Wiggins and McTighe
Lesson Sequence (30 minutes)
- This activity is an opportunity for students to create their own nature center journal that they will take out with them each and every trip to the nature center. This journal will fill up over the school year with lesson handouts, sketches, poetry, writing, leaf rubbings, and observations. It is important for students to know that this is their journal and it will contain their ideas and thoughts.
- To prepare for this activity you will want 20-25 sheets of copier paper and a 9x12 sheet of construction paper for each student. Students may also want colored pencils or crayons.
- Let students know that naturalists are people who interact with nature and make observations of the natural world around them. Good naturalists have a journal that they keep their observations and learning in.
- Journals are simply made by folding the copier paper and construction paper in half and stapling the folded edge, creating a 6x9 booklet with 40 to 50 pages for future journal entries. Students can work in pairs to accomplish this task. (15 minutes)
- Students that finish early can assist others or create a sketch for their cover.
- Allow time for everyone to create a sketch for their cover. A favorite place, moment, animal, tree, flower, etc. (15 minutes)
- Demonstrate how every journal entry will begin. We will do this for activities, drawings, reflections, everything. See attached example.
- I would resist going out to use the journals until a nature center “Y” chart has been made and added to the journal.

Date - Oct. 15, 2017
Location - Barney’s Pond
Weather - Partly sunny 62 deg.
Outdoor Classroom “Y” Chart

Desired Results

**Established Goals:** “Trojan Pride” in the nature center. Based on the schoolwide restitution model of classroom management students can manage their behavior in the nature center with respect for self, others, property, nature, plant life and wildlife. Based on the book *It’s all about WE, Rethinking discipline using restitution* by Diane Gossen

<table>
<thead>
<tr>
<th>Understandings:</th>
<th>Essential Questions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will know that…</td>
<td>- What does our class look like in the outdoor classroom?</td>
</tr>
<tr>
<td>- success in the nature center and outdoor classroom is dependent on student behavior.</td>
<td>- What does our class sound like in the outdoor classroom?</td>
</tr>
<tr>
<td>- the nature center and outdoor classrooms are places of learning similar to their indoor classrooms.</td>
<td>- How does our class feel like in the outdoor classroom?</td>
</tr>
</tbody>
</table>

**Students will know…** trips to the nature center are educational.

**Students will be able to…** demonstrate appropriate behavior on trips to the nature center.

Assessment Evidence

**Performance Tasks:**
- Share together as a class and add to the class “Y” chart defining what the class should look, sound, and feel like in the school’s outdoor classroom.
- As a class go on a brief (5 minute) hike into the nature center stopping at one of the outdoor classrooms.
- As a class celebrate and share direct examples of successes from the “Y” chart.

**Other Evidence:**
- Students demonstrate appropriate behavior in the nature center and outdoor classroom.
- Share direct examples of appropriate behavior.
- Students make amendments to the class “Y” chart.

Learning Plan

**Learning Activities:**
- Students will work together, as a class, in a learning circle or rug time format and create a “Y” chart that will be used to identify expectations for behavior in the school nature center. (15 minutes)
- Once a class chart is made take the chart and students on a brief hike to the closest outdoor classroom in the nature center, bringing the “Y” chart. (5 minutes)
- Once at the learning circle take time for all to share/celebrate direct examples of success from the “Y” chart. 10 minutes)
- Once back in the classroom, hang the “Y” chart up and offer time for anyone to amend the original.
- Reference the “Y” chart periodically before visits and lessons in the nature center.

Template adapted from Understanding by Design, written by Wiggins and McTighe
**Lesson Sequence (40 minutes)**

Preparation for the lesson requires a large “Y” chart, on chart paper, hanging in the classroom.

Begin the lesson by gathering the class on the rug (morning meeting style) and explain that as a class they are going to fill in a class “Y” chart. The chart will be used to create classroom expectations when class takes place in the nature center or elsewhere on school grounds.

Often students associate being in the nature center with recess. It is necessary to teach the students that the nature center is an outdoor classroom and has similar expectations to the indoor classroom.

Allow students to share what the class should look like, sound like and feel like when learning in the nature center. This can also be copied into their nature center journals. Add student input to the “Y” chart. (10 minutes)

Once the class is satisfied with the creation of the chart, review the expectations. (3 minutes)

Take the class, and the “Y” chart, out to the nature center on a 5 minute hike to the learning circle or familiar spot. Review the “Y” chart and give students a chance to reflect on how they have done in relation to the “Y” chart expectations. Celebrate successes. (15 minutes)

Hike the class back to the school and once back in the classroom gather again in the front of the room, morning meeting style. Give students time to reflect and possibly amend the “Y” chart. Add to the chart as needed. (10 minutes)

Use this chart for review before future lessons and activities in the nature center or outdoor classroom.
Nature Center Expectations
## Adopt a Tree by Project Learning Tree

### Desired Results

<table>
<thead>
<tr>
<th>Established Goals:</th>
<th>Science 3.1.1.2.3 Maintain a record of observations, procedures, and explanations, being careful to distinguish between actual observations and ideas about what was observed.</th>
<th>Science 3.1.3.2.2 Recognize that the practice of science and/or engineering involves many different kinds of work and engages men and women of all ages and backgrounds.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Understandings:</th>
<th>-Trees play an important role in the environment.</th>
<th>Essential Questions:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-Many wildlife rely on trees for their own survival.</td>
<td>-How will understanding and awareness of local environment develop over the school year by adopting/observing a tree?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-What will my observations tell me about the role trees play in the environment?</td>
</tr>
</tbody>
</table>

**Students will know**… Trees play an essential role in the environment.

**Students will be able to**… Document observations of their tree, over the school year. These observations can be in the form of writing or pictures in their nature center journals. Make connections between their tree and the local environment.

### Assessment Evidence

<table>
<thead>
<tr>
<th>Performance Tasks:</th>
<th>Students will collect year-long observations in their nature center journal. Entries. Will be written or drawn.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Evidence:</td>
<td>Students can write a diary entry from the perspective of their tree. Students can create a sketch of their tree and all of the wildlife that call that tree home.</td>
</tr>
</tbody>
</table>

### Learning Plan

**Learning Activities:** -Students will be taken to an area of the nature center where they can each, or pairs, can select a tree to adopt for the school year. -Students are given time to observe the tree and document observations in their nature center journals. -Students should be allowed time several times, throughout the year, to stop and check in on their tree, allowing time for additional observations. -See attached PLT Adopt a Tree Activities sheet for additional opportunities. -At years end students can share out year-long learning.

Template adapted from Understanding by Design, written by Wiggins and McTighe
Lesson Sequence (45 minutes)

-Briefly review the “Y” chart of expectations from the beginning of the year. (3 minutes)

-Explain today’s trip in the nature center or area on school grounds. Let them know that they will be adopting a tree on school property and documenting observations in their nature center journals, today and over the school year. (3 minutes)

-Pose the question to the students, What will my observations, today and in the future, tell me about the role trees play in the environment? Allow time for a pair and share and a few share alouds. (8 minutes)

-Take the class to a pre selected area with plenty of trees to adopt. I suggest location 5 on the nature center map. There is a large variety of trees to choose, deciduous and coniferous, young and old.

-Allow time for students to adopt a tree and make as many observations as they can in their nature center journal. (15 minutes)

-Circle up the class for an opportunity to share out learning and observations. If time allows, students can tour adopted trees. (10 minutes)

-Be sure to remind students that they will be checking in on and observing their adopted tree throughout the school year.

-Links to digital copies of the mentioned worksheets:
  Adopt A Tree Activities - by Project Learning Tree

  PLT Adopt a Tree Certificate - by Project Learning Tree
Project Learning Tree Adopt a Tree Certificate

Official Tree Name

Nickname

Birthplace

Circumference  Height

Identifying Characteristics

Adopted By

Date Adopted

One Especially Interesting Thing About My Tree Is:

In the box above, make a leaf or bark rubbing of your tree.
Adopt a Tree Activities

Keep notes and drawings in your journal.

1. Make a sketch of your tree. Draw the shape of its trunk, branches, and canopy (treetop).

2. Find out what kind of tree it is. Does it have any fruits, nuts, or seeds that help identify it? Sketch what you find. Use a field guide or other reference guide to look up its name.

3. Where is your tree? Draw a map to show its location.

4. Draw a picture of your tree from various perspectives: from a distance, from a high place, or from lying underneath looking up.

5. Investigate the health of your tree. Is it alive? How can you tell? Is it healthy? In what ways are people helping or hurting it?

6. Write 10 words to describe your tree, and then use these words in a paragraph or poem about your tree.

7. Draw a picture of a leaf from your tree. How does the leaf smell? How does it feel?

8. Make a rubbing of your tree’s bark using the edge of a crayon or a soft-leaded pencil. How does the bark feel? How does it smell?

9. Are any animals on or near your tree? Don’t forget to look for insects, spiders, and other small animals. Use binoculars or magnifiers for a closer look.

10. Are there any signs that animals have used your tree in the past? Look for holes, nests, trails, and other animal signs and describe what you see.

11. Each time you visit your tree, describe any changes you notice since the last visit.

12. Take photographs of your tree every visit. Look at several of the different photographs at once. In what ways has your tree changed over time and in what ways has it stayed the same?

13. Keep a journal of seasonal changes in your tree. When do the leaves start to fall? When do the leaf buds form on the branches? When do the fruits or seed pods ripen?
**Time of the Grasshopper (Fall) by Larry Wade**

<table>
<thead>
<tr>
<th><strong>Established Goals:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Science 3.1.1.2.3 Maintain a record of observations, procedures, and explanations.</td>
</tr>
<tr>
<td>Science 3.4.1.1.1 Compare how different structures of plants and animals serve various functions of growth, survival and reproduction</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Understandings:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>-different parts of the grasshopper serve different functions for survival</td>
</tr>
<tr>
<td>-like all life grasshoppers have a specific life cycle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Essential Questions:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>How do the different parts of a grasshopper help it grow, survive and reproduce?</td>
</tr>
<tr>
<td>What is the life cycle of a grasshopper?</td>
</tr>
</tbody>
</table>

**Students will know…**
- Body parts of the grasshopper.
- Life cycle of the grasshopper

**Students will be able to…**
- Locate and identify 4 or more body parts of a grasshopper.
- Describe the life cycle of a grasshopper

### Assessment Evidence

<table>
<thead>
<tr>
<th><strong>Performance Tasks:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>-Complete the attached grasshopper life cycle worksheet.</td>
</tr>
<tr>
<td>-Complete the attached worksheet identifying the body parts of a grasshopper</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th><strong>Other Evidence:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>-Describe the different body parts of a grasshopper and their function.</td>
</tr>
<tr>
<td>-Draw and label an example of a grasshopper and its body parts in their nature center journal.</td>
</tr>
<tr>
<td>-Map the life cycle of a grasshopper in their nature center journal.</td>
</tr>
</tbody>
</table>

### Learning Plan

<table>
<thead>
<tr>
<th><strong>Learning Activities:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Review the nature center expectations “Y” chart from lesson 1.</td>
</tr>
<tr>
<td>-Students will have time in the man-made prairie and marsh area to identify and study grasshoppers using the provided pictorial key.</td>
</tr>
<tr>
<td>-Time is given for documentation and sharing</td>
</tr>
<tr>
<td>-Students complete the two attached worksheets on body parts and life cycle.</td>
</tr>
<tr>
<td>-Students reflect in their nature center journals by writing or drawing.</td>
</tr>
</tbody>
</table>

Template adapted from Understanding by Design, written by Wiggins and McTighe
Lesson Sequence (50 minutes)

- This could easily be a week long study but can also be a one day outing. This lesson sequence is for a one day explore of grasshoppers with the goal for students to get hands on experience with grasshoppers and learn the body parts and life cycle of the grasshopper.
- Prepare for the lesson by familiarizing yourself with the attached PDF’s of the grasshopper unit. Make copies of Grasshopper Magic and Grasshopper Life Cycle.
- In the classroom and in small groups students can add Grasshopper Magic to their nature center journals and work together to identify all of the parts of a grasshopper. (10 minutes)
- Place a master on the board for students to compare to.
- Before going outside briefly review of the nature center “Y” chart created in the Fall. This sets the students up with expectations in the nature center and will help them be successful. Also remind students that we always respect wildlife and never harm wildlife in our nature center. (5 minutes)
- Take the class to the nature center, along with their journals, to look for grasshoppers. I suggest the prairie or trail by the marsh. Allow small groups of students time to explore for grasshoppers. Listening can be as helpful as eyesight in this activity. Students should compare their grasshopper body parts to the Grasshopper Magic sheet filled out in class. Students should document findings in their journal. (20 minutes)
- Upon return to the classroom students can reflect in their journals by drawing their grasshopper or writing a poem about grasshoppers. (10 minutes)
- Grasshopper Life Cycle can be used as a follow up activity or whole other lesson.

- Links to digital copies of the mentioned worksheets:
  Time of the Grasshoppers - Nature Seeker Workbook by Larry Wade
Grasshoppers

Long-horned Grasshoppers

A Katydid is 2-3 inches long. They are all green in color and their wings look like leaves. Katydid are found in bushes and tall grass. Katydid are very difficult to find, since they are so well camouflaged. The easiest way to find one is to wait till dark and listen for the call of a male ("tst-tst") and then try to track it down. Once you locate one, they are pretty easy to catch since they move very slowly and depend upon camouflage to avoid predators.

Meadow Grasshoppers are found in tall marsh grass. They are all green in color and are 1-2 inches in size. Males make a repetitive buzzing sound and call from a grass stalk during the heat of the day.

Short-horned Grasshoppers

Spur-throated grasshoppers are the most common hoppers. There are several species. I am not sure of the name, it has red hind legs and can be abundant. They are one inch in size. A larger relative, has yellow legs and can be up to 2 inches. Yellow-leggeds are very active in an aquarium.

Carolina grasshoppers or locusts are the largest grasshoppers (2-3 inches). They are found on dry open areas. They are camouflaged gray to brown in color and have black wings when they fly.

Pygmy grasshoppers are the smallest grasshopper. They are also the longest live grasshoppers (2 years). The first year nymphs are ½ inch in size and can be brown or green with pink lips. They are found in unmowed short grass.

Identifying Males and Females

Male

Female

Claspers

Ovipositor

Image Source - Nature Seeker Workbook by Larry Wade
Grasshoppers of the Midwest

Start

Short horn-antennae less than one inch

Size: 1 inch or more

Brown color; Size 2 inches

Size: ½ inch

Green or Brown

Pigmy Grasshopper
(found in unmowed green)

Green Color

Up to 2 inches – Yellow legs

Yellow legged Grasshopper

One inch – red legs

Red Legged Grasshopper

Very common

Carolina Grasshopper
(found on bare ground)

Katydid

Found in bushes

Leaf-like? 2 inches long

Active singer – one inch long. Antennae 2 inches

Meadow Grasshopper

Buzzing found in marshy areas

Brown or black body

Greeter

Found in Grass

Image Source - Nature Seeker Workbook by Larry Wade
Grasshopper Magic

Label the insect parts:

1. __________
2. __________
3. __________
4. __________
5. __________
6. __________
7. __________
8. __________
9. __________

Head of a Hopper

Insect Parts

- Head
- Thorax (behind head)
- Abdomen (rear part of the body)
- Compound eyes
- Scissor-like mouth
- Antennae (feel/hear)
- Wings
- Ears (behind ampits)
- Spiracles (breathing; found on abdomen)
- Makes sound by rubbing

Image Source - Nature Seeker Workbook by Larry Wade
Grasshopper Life Cycle

What to Do: Write the correct information that goes with each part of the life cycle.

October–April

2. Stage:____

September

1. Stage: ____________

August–September

4. Stage: ____________

May–July

3. Stage: _______

Nymph Stage: A nymph will shed its skin 5 times before coming an adult. label the wing buds (undeveloped wings).

Egg Stage: Eggs remain in the ground all winter. The eggs hatch when the ground warms up.

Egg laying Stage: The females lay eggs in the ground. When weather gets cold, the grasshoppers die.

Adult stage: Adult has full development of the wings (label wings).
## Deciduous Tree Identification from Nature Seeker Workbook

### Desired Results

**Established Goals:**
Science 3.4.1.1.2. Identify common groups of plants and animals using observable physical characteristics, structures and behaviors.  
Math 3.4.1.1 Collect, display and interpret data using frequency tables, bar graphs, picture graphs and number lines.

**Understandings:**
- Different deciduous trees have different leaves.  
- Deciduous trees lose their leaves in the Fall.  
- We have a variety of deciduous trees in our nature center

**Essential Questions:**
- Can the leaves of trees help us to identify different deciduous trees in the nature center?  
- What does a tree inventory tell us about our nature center, yard, community, etc.?

**Students will know…**
how to use the provided key and pictures to identify common trees found in our nature center.

**Students will be able to…**
- use the picture key to identify and inventory different types of deciduous trees.  
- graph their group results

### Assessment Evidence

**Performance Tasks:**
Work in small groups using the key and pictures to identify 4 or more types of deciduous trees.  
- Work in small groups to inventory the number of types of trees in the nature center.

**Other Evidence:**
- Display tree data in a different graphic organizer i.e. picture graph, pie chart.  
- Create their own leaf identification key in their nature center journals using leaf rubbings and descriptors.

### Learning Plan

**Learning Activities:**
In the nature centers deciduous forest area, students work in small groups, using the provided key, to identify trees based on leaves on the tree or ground. Students then inventory the number of certain trees in the deciduous forest area. Students display their data in a bar graph on the provided worksheet.

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Template adapted from Understanding by Design, written by Wiggins and McTighe
**Lesson Sequence (50 minutes)**

- To prepare for the lesson copies need to be made for each group. PDF’s can be found at the link below.
- Students will work in small groups of three or four using the provided key and their nature center journals to identify deciduous trees in the nature center.
- Ask students what they know about deciduous trees, trees that lose their leaves in the fall and regrow new ones in the spring. Explain that there are many types of deciduous trees in the world and our nature center has several that can be identified. (5 minutes)
- Let students know that they are going to go out to the deciduous forest area of the nature center to identify and inventory the different types of trees. Pass out the leaf key and tree key, 1 packet per group. Pass out “What are the Most Common Trees” bar graph worksheet to each student, to be added to their journal. (3 minutes)
- Review the “Y” chart expectations for the nature center. (3 minutes)
- Take students to the deciduous forest area of the nature center and demonstrate for the group how to use the leaf key to identify the type of tree you selected. Answer any possible questions. (8 minutes)
- Give small groups time to explore the area, identify and inventory many different types of tree. (20 minutes)
- Back in the classroom give time to finish bar graphs and share findings. (10 minutes)
- If time allows a gallery walk is a great way for others to see data collected.

**Digital copies of print materials**

*Tree Unit PDF's - Nature Seeker Workbook by Larry Wade*
Common Trees

Lobed Leaves

**Bur Oak**
Leaves turn brown in fall

**White Oak**
Leaves turn burgundy in fall

**Red Oak**
Leaves turn red in the fall

**Pin Oak**
Has "alligator" bark.

[Leaf illustrations for each type of oak]

Lobed Leaves

**Silver Maple**
Leaves turn yellow in the fall

**Sugar Maple**
Leaves turn orange in the fall

[Leaf illustrations for each type of maple]

Large Rounded Leaves

**Cottonwood**
Older trees have large trunks
Cotton-like seeds
Makes a whispering sound in the wind.

**Basswood**
Often has multiple trunks
Leaves can be several inches across

[Leaf illustration for each type of tree]
Small Rounded or Triangular Leaves

**Quaking Aspen**
- Dark brown twigs
- Small round leaves
- Makes a whispering sound in the wind

**Hackberry**
- Cork-like bark
- Berries in mid summer
- Leaves often have "bumps" on them and can be yellowish-green

**Paper Birch**
- White flakey bark

Compound Leaves

**Box Elder**
- 3-5 leaflets
- Has "helicopter" seeds

**Green Ash**
- 5-7 leaflets

**Smooth Bark Hickory**
- Less than 10 leaflets

**Butternut**
- 11-17 leaflets
- Similar to walnut
- Fruit is lemon-shaped

**Honey Locust**
- Bean-like seed pod
- Seedlings can be highly invasive
Smooth and Shiny Leaves

**Black Cherry**
- Black fruit in mid-summer
- Flaky bark on mature trees

**Buckthorn**
- Has a simple leaf
- Non-native
- Highly invasive
- Dark fruit

Long and Narrow Leaves

**Black Willow**
- Grows only in damp places
- Thin leaf

Leaves with Saw-Toothed Edges

**Ironwood**
- Leaves feel fuzzy and soft
- Grows in the understory of the forest
- Leaves remain during winter

**American Elm**
- Leaves feel rough

Image Source - Nature Seeker Workbook by Larry Wade
What are the Most Common Trees in Your Neighborhood?

**What to do:** Before the leaves drop in September/October, or after "leaf out" in May, take a hike in your neighborhood. Use the information on the previous pages to determine what species of trees are in your neighborhood or park. Make a tally next to the picture on the previous pages (Common Trees) for each type of tree you find. After the hike, write down the eight most common trees at the bottom of the graph below. Then create a bar graph based upon your data from the hike (see example below).

<table>
<thead>
<tr>
<th>Number of Trees</th>
<th>Types of Trees Observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
</tr>
<tr>
<td>12</td>
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<td>8</td>
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<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Example</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Example: You saw 4 sugar maples on the hike.

3 points for identifying trees in your neighborhood.
1 point for every tree identified (maximum of 7 points)
2 points for completing the bar graph above.

Total possible points for this activity: **12 points**

Your total Points: ___
**Estimating Tree Height Adapted from Nature Seekers Workbook**

**Desired Results**

**Established Goals:**
MN Science 3.1.1.2.4 Construct reasonable explanations based on evidence collected from observations or experiments.  
MN Math 3.1.3.1 Read and write fractions with words or symbols.

**Understandings:**
Using the known height of a partner they can estimate the height of a tree.  
They represent one piece, or fraction of the tree, or whole.

**Essential Questions:**
- When things are too tall to measure, how can we estimate their height?  
- How does a person’s height relate/compare to that of a tall object, i.e. a tree?

**Students will know…**
- how to use calculate the height of various trees.  
- how to represent, as a fraction, their height in comparison to various trees.

**Students will be able to…**
- work together to estimate the heights of 3 or more trees.  
- collect data and document observations.

**Assessment Evidence**

**Performance Tasks:**
- Work in small groups to measure and document their own height to the nearest half foot.  
- Estimate and document the height of 3 or more trees of varying height.  
- Use fractions to compare themselves to the height of trees.

**Other Evidence:**
- Written or verbal response to the essential question.  
- Written, organized data collection in nature center journal.  
- Drawing or sketch of themselves compared to tree, to approximate scale.

**Learning Plan**

**Activities:** See attached lesson, *Nature Seeker Workbook – Estimating the Height of Trees*  
- Use nature center journals to document and organize all data and observations.  
- Work together in small groups to measure the height of all group members to the nearest half foot.  
- Use the height of different group members to estimate the height of 3 or more trees, using the supplied handout from *Nature Seeker Workbook*.  
- Compare group member height to that of a tree using fractions.  
- Draw a sketch, to scale, to compare themselves to the height of a tree.

Template adapted from Understanding by Design, written by Wiggins and McTighe
Lesson Sequence (45 minutes)

- Prepare for the lesson by familiarizing yourself with the process for estimating the height of trees, see attached. Students will need a meter stick or tape measure per pair or group.
- Start the lesson with a brief review of the nature center “Y” chart created in the Fall. This sets the students up with expectations in the nature center and will help them be successful. (3 minutes)
- In small groups give students a chance to brainstorm ideas for a process to measure the height of a tree. Their adopted tree from the Fall will help them visualize the task. Acknowledge all ideas and explain that they will all be trying a similar method in the nature center. (8 minutes)
- Take the group out, with their nature center journals, to the area where their adopted trees are located. Demonstrate for students the process outlined in the handout. Select a student helper, measure and record their height, then estimate the height of the selected tree. (7 minutes)
- Have students work in pairs to repeat the process documenting all findings in their journals. Students should try to estimate the height of their adopted tree if possible. Groups should be able to estimate the height of 3 to 5 trees. (20 minutes)
- Return to the classroom to share findings and successes. (10 minutes)

- Links to digital copies of the mentioned worksheets:
  Estimating the Height of Trees - Nature Seeker Workbook
The Old Naturalist - Estimating the Height of Trees

Have you ever wondered how tall a tree is? Below is a simple method for estimating tree height. For this activity you will need to have another person working with you. You will also need to know that person’s height (round off to the nearest 6 inches; For example, if someone is 4'10”, use 5 feet). In addition to having an assistant, you will also need a pencil. Lastly, the tree you select will have to be on flat ground.

What to Do: Ask your assistant to stand directly beneath the tree. The farther away that you can stand from the tree and still see the top of it, the more accurate your measurement will be. Take your pencil or stick and slide your thumb up and down until the top of your thumb is lined up on your assistant’s shoes and the top of his/her head is lined up with the tip of the pencil. Close one eye, and using your pencil, step your way up the tree. Each step-up is the height of your assistant. Keep track of the number of pencil heights as you moved up the tree.

The height of the tree = (number of times you used your pencil to stack your assistant up the tree) x (the height of your assistant).

* If the assistant is 5.5 feet, the tree height is: 5.5 x 4 = 22 feet tall.
## Desired Results

**Established Goals:** MN Science 3.1.1.2.3 Maintain a record of observations, procedures and explanations.  
MN Science 3.1.3.2.1 Understand that everybody can use evidence to learn about the natural world, and identify patterns in nature.  
MN Science 3.1.3.4.1 Use tools including rulers to improve observations and keep a record of the observations made.

**Understandings:**  
- There are many deer that frequent their nature center.  
- They can use observations and evidence to understand the animals living in the nature center.  
- Deer signs look different for deer of different ages

**Essential Questions:**  
- How many deer are living in our nature center?  
- How do bed size, deer trails, and scat findings correlate to deer population in the nature center?  
- How do tools and data collection of evidence help make observations about deer?

**Students will know…** basic deer observations to make in the nature center.  
- Identify measure the dimensions of a deer bed, identify and inventory deer scat, identify and collect data from deer trails.

**Students will be able to…** use their observations to make predictions about the deer population in the nature center.

## Assessment Evidence

**Performance Tasks:**  
- Document all observations in their nature center journal.  
- Work in small groups to collect evidence and make observations.

**Other Evidence:**  
- Data tables, sketches or written observations from the deer hike.  
- Oral, written response to the essential questions.  
- Photographic evidence of observations, digital presentation.

## Learning Plan

**Activities:** See attached lesson, *Nature Seeker Workbook– WhiteTail Deer Population Study*  
- Use nature center journals to document and organize all data and observations.  
- Work together in small groups to document the observations of deer in our nature center.  
- Use supplied handout from *Nature Seeker Workbook* and nature center journal to identify and record deer observations.  
- Use observations and data collected to make predictions about the deer population in the nature center.

Template adapted from Understanding by Design, written by Wiggins and McTighe
Lesson Sequence - 50 minutes

- Prepare a copy of the WhiteTail Deer Population Study for each student. Each group of two or three should also have a tape measure or meter stick.
- Start the lesson with a brief review of the nature center “Y” chart created in the Fall. This sets the students up with expectations in the nature center and will help them be successful. (3 minutes)
- Pose the questions to the students in a group discussion, do we have deer living in the nature center? How do you know? What evidence do you have? Possible pair and share. (7 minutes)
- Let students know they are going out to the nature center today to look for evidence of deer in the nature center. Pass out the worksheet to students and briefly review the three signs of deer they will be looking for today. See attached. (5 minutes)
- Take students into the nature center through the northeast entrance and up to the prairie. THis path typically has deer trails and evidence. Allow time on hike and in the prairie for students to collect data and make observations. (25 minutes)
- When back in the classroom allow groups to share student thoughts/ideas about the population of deer in the nature center. Post evidence gathered for all to see. (10 minutes)
- This worksheet should be added to their ongoing nature center journal

- Links to digital copies of the mentioned worksheets:
  The Old Naturalist - White Tail Deer Population Study - Nature Seeker Workbook by Larry Wade
  Population Study Student Worksheet - Nature Seeker Workbook by Larry Wade
The Old Naturalist - White Tail Deer Population Study

Do you have a deer herd in your neighborhood? How can you find out what is the population structure of the herd? Population structure has to do with the number of fawns, yearlings (one year olds), adult does and bucks in the herd. To view photos and learn more about white-tailed deer go to: www.oldnaturalist.com/white-tail-deer-2

First it is important to be able to recognize three different white-tail signs: deer beds, scat and deer tracks.

A deer bed is a sign of a deer resting area. Deer lie down in the evening and remain there most of the day. Deer will not bed in windy areas because they need to conserve their body heat in the winter. Most deer beds are found in areas protected from the wind, and on south-facing hillsides. South-facing hills are warmed by the sun sooner on cold wintry days and allow deer to conserve body heat. In the summer, it is easier to find deer beds in prairie grass because their bodies leave an imprint. However, summer deer beds may have deer tick nymphs, so it is not a good idea to inspect them too closely.

Another important deer sign is deer scat or poop. Deer scat is very dry and there are several pellets in one poop. Many naturalists I know have made deer scat necklaces which they have proudly worn with their school groups.

Another deer sign to look for are deer trails. Deer may use the same trail over a period of time. Hoof prints and scat can also be found on the trail. Late spring is not a good time to follow deer trails because of the increased incidence of deer ticks and Lyme disease.

What to do: How to do a deer population study:

Go out into the woods looking for deer signs. If you record some simple field observations, you will get a good idea what age groups of deer live in the neighborhood. You will need a tape measure to determine the deer bed size. When it comes to analyzing scat, count individual clumps, not individual pellets. Make a tally for each of the signs that you find. The number of tallies that you make for each age class, will give a good idea of what the population structure of white-tails is in your neighborhood/park.
White Tail Deer Population Study

<table>
<thead>
<tr>
<th>Actual Seat Size</th>
<th>Age Class</th>
<th>Number of Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>fawn</td>
<td></td>
</tr>
<tr>
<td></td>
<td>yearling or adult doe</td>
<td></td>
</tr>
<tr>
<td></td>
<td>adult buck</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Deer Bed Sizes</th>
<th>Age Class</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>22&quot; X 35&quot;</td>
<td>fawn</td>
<td></td>
</tr>
<tr>
<td>24&quot; X 40&quot;</td>
<td>yearling or adult doe</td>
<td></td>
</tr>
<tr>
<td>31&quot; X 50&quot;</td>
<td>buck</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actual Hoof Sizes</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>fawn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>yearling or doe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>buck</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total points for activity: 3 points if you went out looking for deer signs.
Two additional points if you found 6 different deer signs.
Add two more points if you found more than 12 deer signs.
Total possible points: 7

Total points for you: ______________________
# Spider Web Geometry adapted from Project WILD

## Desired Results

<table>
<thead>
<tr>
<th>Established Goals:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science 3.1.3.2.1 Understand that everybody can use evidence collected to learn about the natural world, identify patterns in nature, and develop tools.</td>
</tr>
<tr>
<td>Math Standard – Geometry and Measurement, Use geometric attributes to describe and create shapes in various contexts.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Understandings:</th>
</tr>
</thead>
<tbody>
<tr>
<td>-people and wildlife share environments.</td>
</tr>
<tr>
<td>-spiders are different from insects</td>
</tr>
<tr>
<td>-spider webs can be examples of geometric patterns in nature</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Essential Questions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Are spiders wildlife?</td>
</tr>
<tr>
<td>-Are spiders insects, how are they different?</td>
</tr>
<tr>
<td>-Are there patterns in a spiders web, nature?</td>
</tr>
</tbody>
</table>

## Students will know…

- how to differentiate between arachnids and insects.  
- they are a part of a system they share with wildlife.  
- how to identify patterns in nature.  

## Students will be able to…

- use geometric shapes to reconstruct a spiders web of their design.  

## Assessment Evidence

### Performance Tasks:

- students will recreate spider webs using pattern blocks, displaying geometric patterns.  
- identify three characteristics that make spiders different from arachnids.  

### Other Evidence:

- draw a web and identify 3 geometric shapes used in the pattern.  
- write a short reflection of learning in student nature center journal.  

## Learning Plan

### Learning Activities:

- In class students share out similarities and differences between insects and arachnids  
- In small groups students will look in the nature center for spider webs and document observations in journals.  
- Groups will look for and identify geometric shapes and patterns in the webs of spiders  
- In their nature center journals students will recreate a spider web pattern using pattern blocks from their math kit.  
- Extension activity, Reading 3.6.7.7 – Conduct short research projects that build knowledge about a topic.  
- Give students time in groups of 3 or 4 time to research their spiders and share with the class.  

Template adapted from Understanding by Design, written by Wiggins and McTighe
Lesson Sequence (45 minutes)
- Prepare for the lesson by setting aside pattern blocks, or pattern templates from the math supplies for later use.
- In nature center journals have students work in pairs to create a venn diagram or double bubble map comparing spiders and insects. (8 minutes)
- Talk as a class about the similarities and differences. (5 minutes)
- Have students bring their journals out to the nature center on a search for spider webs.
- As students find webs they should document and sketch the webs they have found, paying close attention to the different geometric shapes they see. (20 minutes)
- Back in class students can do a gallery walk to see others findings. (3 minutes)
- In journals students use pattern blocks to create their own webs, tracing the blocks and creating a web in their journal.
- If time the following video can be watched. This video is by the BBC and is a time lapse of the spider web making process.

Spider Web Time-Lapse | Earth Unplugged - by BBC Earth Unplugged (4 minutes 46 seconds)
**Ants Marching adapted from Project WILD**

### Desired Results

**Established Goals:**
- Science 3.1.1.2.1 generate questions that can be answered when scientific knowledge is combined with knowledge gained from one’s own observations or investigations.
- Science 3.1.1.2.4 Construct reasonable explanations based on evidence collected from observations or experiments.

**Understandings:**
- Students will identify similarities and differences between ants and humans focusing on basic needs
- Identify that wildlife and humans share a lot of the same basic needs

**Essential Questions:**
- Through observation, what needs do ants have?
- What needs do we share with ants or wildlife?

**Students will know…**
- That humans and wildlife share a lot in common.

**Students will be able to…**
- Demonstrate, describe observed ant behavior.
- List observed basic needs of ants/wildlife.

### Assessment Evidence

**Performance Tasks:**
- Describe or document three ant behaviors observed.
- Choose one behavior and explain or demonstrate how this behavior helps the ant survive.

**Other Evidence:**
- Creatine writing about ants and survival
- Venn diagram comparing ants and self

### Learning Plan

**Learning Activities:**
- Taking the class around the school grounds or into the nature center with their nature center journals.
- Working in groups of three to four students should observe and document evidence of ant basic needs and ant behavior.
- Gather as a class to share out and give students a chance to demonstrate ant behavior and explain how these behaviors meet basic needs.
- Connect how these behaviors are similar to our needs as humans.

Template adapted from Understanding by Design, written by Wiggins and McTighe
Lesson Sequence (45 minutes)
- Have students brainstorm, in small groups, what some of their basic needs are. Share out a class some of the students basic needs they came up with. (5 minutes)
- Give students a chance to pair and share what they already know about ants. (5 minutes)
- Explain to the students that they are going outside to find and observe ants and their basic needs. These needs will have to be observed through ant behavior and interpreted by the small groups.
- Have students bring their notebooks and join you on a walk to a location on the property where ants marching can be found. Ants can usually be found in planters, under rocks, large grassy areas and under logs.
- Give student groups time to observe, document and interpret behavior of ants in the wild. Remind students they are looking at their behavior to understand ants basic needs. (20 minutes)
- Return to the classroom where time is given to finalize documentation in their journals. Students can volunteer to demonstrate ant behavior and classmates can try to guess the basic need being met, like charades. (15 minutes)

- If time there are many ant videos for kids on youtube. This one is by BBC Earth with Sir David Attenborough (3 minutes 54 seconds)

Ants - BBC Earth
Short Staff Development for 3rd Grade Staff

The lessons alone are not enough to see real long term change in grade level, or school, culture. Handing out a packet of lessons and wishing staff well will yield little or no results. In order for teachers to open themselves up to something new there also needs to be the support of a fellow staff member who has been successful in accomplishing the requested change. In order to kick off this change and offer my support I plan to meet with the third grade team after school to hold a short, informal professional development. Along with the following slides is a planned mini activity outdoors to demonstrate ease and many benefits of offering outdoor environmental education to our students.
Using the Outdoor Classroom to Meet Academic Standards

Math, Reading, and Science

Seat time is on the Rise

Image source: www.learnhub.com

Image source: vegetableproject.org

Underused Resource

Results of a
informal staff
survey done in
June 2018.

How many times this school year have you taken your class outdoors to the
nature center, pond, or rain garden? *FL. perturbs provided by our Naturalist.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Pie Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 times</td>
<td>30%</td>
</tr>
<tr>
<td>10 times</td>
<td>25%</td>
</tr>
<tr>
<td>15 times</td>
<td>20%</td>
</tr>
<tr>
<td>More than 50 times</td>
<td>15%</td>
</tr>
</tbody>
</table>
Speakers Notes

Slide 1 - Effort to increase use of the nature center for academic purposes
  - 3rd grade focus

Slide 2 - It’s nice to be indoors but we have tremendous opportunity in our nature center.
  - Enough with posters and nature themed classrooms use the three we have.
  - In our end of year feedback for 4th grade an overwhelming % of students site outdoor lessons as their favorite experiences.

Slide 3 - Use of the nature center as an educational resource
  - Teacher led outings not including the naturalist

Slide 4 - Many staff (37%) site lack of knowledge as a barrier to using the nature center.
  - My hope is to demonstrate that everyone is a naturalist, the students inquiry drives the lesson not teacher knowledge.
Similarly, 79% of staff are not completely comfortable teaching outdoor environmental education.

- Providing quality outdoor education opportunities is **not** a chance to teach the kids what to think, but rather an opportunity to teach them **how** to think.

Many believe that these opportunities are important.

- The science, math and reading are all out there, in the nature center
- Many outdoor opportunities meet state standards in science, math and reading

It is my belief that providing activities that eliminate major barriers will lead to more frequent use of our greatest resource.

- Expert status is not needed
- Standards will be met

EIC for closing the achievement gap

Lessons are curriculum aligned, provide opportunities for outdoor learning, and promote stewardship.

Give brief example for 3 of 5 above.

- I am here to help and have lots more.
Project Resources


