Beech Maple Forest Classroom Unit

Theme: Michigan trees
Unit Connection: Trees are key components in Michigan’s Beech Maple forests (lesson #2)
Subject: Science

Recommended Grade Levels: 1st – 3rd grade
Lesson Length: Part 1: 75 minutes
Part 2: 20-35 minutes

Essential Questions: What are the stages in a tree’s life cycle?
What are some unique characteristics of trees?
How can you use a tree’s characteristics to identify the tree?
What resources does a tree need to survive?

Key Concepts: life cycle of a tree, characteristics of a tree, basic tree identification, extension activity: needs of a tree

Lesson Summary: This lesson can be divided up into two parts, or can be completed all in one session. In part one, the students will act out the life cycle of a tree through a dramatic reading and then discuss the six stages of a tree’s life cycle (seed, sprout, sapling, mature tree, standing dead tree, rotting log). They will then use their senses to investigate a tree, record their observations, and share their findings in a small group. In part two, the students will also learn how a tree leaf key can be a tool used to identify a tree. An optional extension activity allows the children to discuss the survival needs of a tree and to discover what happens when those needs are not met.

Materials: “Terrarium Observation Record” packets (students should already have these)
Dramatic Reading – *Imagining the Life of a Tree*
Tree life cycle image
Field Study Data Sheets – 1 per student
Observation sheets – 1 per student
Clipboards – 1 per student
Hand Lenses – 1 per student
Tree Leaf Key - 1 per pair of students

I. Objectives

Objectives:
1) Students will act out the life cycle of a tree and identify the six stages in a tree’s life cycle (seed, sprout, sapling, mature tree, standing dead tree, rotting log).
2) Students will be able to use their senses to investigate a tree and record their observations.
3) Students will be able to discuss their observations in a small group setting.
4) Students will learn how to use a tree leaf key as a way to identify a tree.
5) Extension activity: Students will be able to identify the four resources that a tree needs to survive.

Michigan State Standards:

<table>
<thead>
<tr>
<th>1st Grade Standards</th>
<th>2nd Grade Standards</th>
<th>3rd Grade Standards</th>
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<tbody>
<tr>
<td>S.IP.01.11 Make purposeful observation of the natural world using the appropriate senses.</td>
<td>S.IP.02.11 Make purposeful observation of the natural world using the appropriate senses.</td>
<td>S.IP.03.11 Make purposeful observation of the natural world using the appropriate senses.</td>
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<tr>
<td>S.IP.01.13 Plan and conduct simple investigations</td>
<td>S.IP.02.13 Plan and conduct simple investigations.</td>
<td>S.IP.03.13 Plan and conduct simple investigations.</td>
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<tr>
<td>S.IP.01.14 Manipulate simple tools (hand lenses) that aid observation and data collection.</td>
<td>S.IP.02.14 Manipulate simple tools (hand lenses) that aid observation and data collection.</td>
<td>S.IP.03.14 Manipulate simple tools (hand lenses) that aid observation and data collection.</td>
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<tr>
<td>S.IA.01.13 Communicate and present findings of observations.</td>
<td>S.IA.02.13 Communicate and present findings of observations.</td>
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<td>L.OL.02.13 Identify characteristics of plants (for example: leaf shape, color, size) that are passed on from parents to young.</td>
<td>L.OL.02.14 Identify the needs of plants.</td>
<td>L.OL.03.41 Classify plants on the basis of observable physical characteristics (roots, leaves, stems, and flowers).</td>
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<td>L.OL.02.22 Describe the life cycle of flowering plants including the following stages: seed, plant, flower, and fruit.</td>
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## II. Before you start

| Prerequisite knowledge and skills | -knowledge of the 5 senses  
- how to use their senses for observation |
|-----------------------------------|----------------------------------------------------------------------------------|

### Assessment

**Assessment (formative and summative)**

**Formative Assessment:**
- Do students participate in the dramatic reading by acting out the life cycle of a tree?  
- Do the students use their senses to explore their trees?  
- Do all of the students share their observations within their small groups?

**Summative Assessment:** Field Study Data sheet & Observation sheet

## III. The Plan

<table>
<thead>
<tr>
<th>Time</th>
<th>Parts</th>
<th>Lesson Description</th>
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| Prep work (before the lesson) | 15 min. | Part 1  
Terrarium Observation Record:  
Students observe their terrariums and record their observations, drawings, and questions in their observation packet.  

**Review:**  
What have we been learning about in science lately? (what makes up a Michigan Beech Maple Forest)  

**Introduction:**  
When you walk into a forest, what plants or animals do you see the most of? What is all around you? (trees) Today, we’re going to be investigating trees and learning more about them. Before we begin our tree investigation, we’re going to review the life cycle of a tree. |
| 5 min. | Motivation (Opening/Introduction/Engagement) | Tree Life Cycle Dramatic Reading:  
Read and act out the attached dramatic reading: *Imagining the Life of a Tree* in order to introduce the students to the life cycle of a tree.  

After completing the reading, review the main life cycle of the tree with the students and show them the attached life cycle image. Make sure to point out and identify the key words like: seed, sprout, sapling, mature tree (produces seeds), standing dead tree, rotting log and explain how a tree goes through that cycle during its lifetime.  

**Adopt a Tree Activity:**  
**Introduction**  
Now that we’ve learned a little more about a tree’s life cycle, we’re going to investigate and explore some trees up close. Each of you will pick out one tree to adopt and to study. You may pick a tree that is in any stage of the tree’s life cycle; it may be a seed, a sprout, a sapling, a mature tree, a standing dead tree, or a rotting log. After you pick out your tree, you’re going to use your senses to explore and investigate your tree and to fill out the observation worksheet. Project worksheet on board and explain it to the students. Model how they can use their senses to explore the tree.  

**Pass out worksheets and clipboards. Have students take 2 pencils with them (in case they lose one).**  

**Investigation**  
Take students to a wooded area and allow them to choose their tree to study and investigate. Encourage the students to all choose a different tree, and to remember that their tree can be in different stages of the life cycle. Walk around and assist students with the worksheet.  

**Discussion**  
After finishing their observation sheets, divide the students up into small groups (3-4 students) and have them share with their partners what they observed while sitting somewhere outside. |
| 10 min. | Development | |
| 25 min. | | |
| 10 min | | Part 2  
**Tree Identification:**  
*Note: Most likely, there won’t be Beech trees near the school, but there will probably be Oak or Maple trees that you can use to demonstrate the tree leaf key.  

Regroup the students after their discussions. |
<table>
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<th>15 min.</th>
<th>Using the attached tree leaf key, teach the students how to use a tree leaf key to identify a tree. Model how to use the key, and depending on the age of the students and the trees that they observed, allow them to work in pairs to identify some trees on their own using the tree leaf key. <em>Return to the classroom after completing the tree investigation.</em></th>
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| 5 min. | **Wrap-Up:**
|---|---|
| 15 min. | - Are all trees the same or different?
- What did you observe on or around your trees?
- What tree characteristics can we use to help us identify a tree? (bark, leaves, seeds, branching patterns…)
- What about a tree’s environment? Can its environment help us identify a tree? Would a cactus be growing in a Beech Maple forest in Michigan? Would a palm tree be growing here? Why or why not?

**Additional extension activity - Every Tree for Itself Activity:**
*Note: Need a large open area for this activity*

**Introduction**
Can a tree grow in a dark, dry, and stuffy closet? No, of course not! They need things that are not in that closet. What are they? (air, water, nutrients/good soil, sunlight) Trees need these ingredients to make sugar in their leaves through a process called photosynthesis. These sugars provide the plant with food. Unlike animals, plants make their own food!

Ask the students to look around the wooded area and see if there is sunlight, water, soil, and air. Even on a cloudy day, it is light enough to provide sun for the trees. There is also soil for the trees to grow in. Ask them to feel the soil and rotting leaves to see if they have any water in them or to look for a nearby pond. There is always air!

*Every Tree for Itself activity (adapted from Project Learning Tree)*

Explain to them that they are now going to become a tree and try to get everything they need to produce their own food and grow tall and strong. Have them plant themselves firmly in a spot and remind them that trees can only move their branches (arms). As they do this, spread out cards representing 3 of the 4 survival requirements (nutrients - brown, water - blue, & sunlight - yellow) all over the ground. Explain that each color square represents a requirement that trees need. Tell them that when the round starts they need to gather as many of the requirement cards as they can. They can only use their arms (aka branches) and cannot move their feet. Let them gather for 30 seconds. Then discuss what happened by asking the following questions.

- Did each tree get all of the requirements?
- What might happen if a real tree lacked one of these requirements? (Answer: it might grow slowly and/or eventually die.)
- Is there such a thing as too much water, nutrients, sunlight? (Answer: yes, any of the above can stress a tree if they receive the requirements in too large of quantities.)

Play as many rounds as desired using the following scenarios:
- Competing trees - Have the students stand together in groups of 3 to 5. Have them compare their results to the first round. What happened? (when trees are close together they compete with each other for resources)
- If a tree did not receive all the resources tell them that they died.
- Drought – only sprinkle a few water cards around on the ground. What happened?
- Poor soil – only sprinkle a few nutrient cards around on the ground to represent poor soil. What happened?

Wrap up this activity by reviewing the four resources that trees need to survive.

**Resources:**
The following website - Environmental Education for Kids! - provides an online, interactive dichotomous tree key for kids to use. Students can click on the options and the key will lead them to identify their tree species. I found this site to be helpful in creating the key for this lesson: [http://dnr.wi.gov/org/caer/ce/eek/veg/treekey/index.htm](http://dnr.wi.gov/org/caer/ce/eek/veg/treekey/index.htm)

Field sheets adapted from Growing Up Wild: Exploring Nature with Young Children by the Council for Environmental Education

Project Learning Tree: Environmental Education Activity Guide published by the American Forest Foundation
A Dramatic Reading: Imagining the Life of a Tree
(Suggested motions are in italics)

Imagine that all of you are seeds that have floated to the ground after being tossed and carried by the wind. (gently rock back and forth as you fall to the ground). You are lying on the ground and the leaves from the trees begin to fall and cover you (curl up in a ball). It feels good to have this warm blanket on top of you as the days grow colder (shiver like you are cold). You slowly begin to drift off to sleep . . . to rest for the long winter ahead (close your eyes and fold your hands together like you are sleeping).

After a while . . . you are awakened by intense heat as sunshine streams through the leaves covering you. It is spring and there is warmth all around. Something is happening inside you . . . and you stretch a small root into the soil (slowly stretch one leg out into the ground). At the same time, you reach toward the sun with a small green sprout (slowly reach one arm out towards the sun). The days grow warmer and the rain comes. You grow quickly, spreading and pushing your roots through the ground. You reach and stretch your branches toward the sky (move to a squatting position and stretch your arms out like branches). Leaves POP out on small twigs along your branches and you grow straight and upright (slowly move upwards until you are standing and wiggle your fingers like leaves blowing in the wind). Your trunk begins to expand and you get fatter. You sway in the breeze and enjoy the sun . . . and feel the coolness of the rain (sway from side to side).

Winter comes again. The sap that is your blood inside slows down and you rest. Many seasons pass . . . and you continue to grow up and up . . . until only a few trees are taller than you (continue to stand straighter and stretch as tall as you can).

One day, a fierce wind blows many of your leaves away and bends you more than ever before. Several of your smaller branches break off (drop one of your arms like a branch that has fallen). Other trees around you fall. Heavy rain falls on your upper branches, runs down your trunk . . . and into the soil where you soak it up with your roots.

Many more seasons pass . . . and you grow very old. Now you can see high above all the other trees. Your bark cracks as your trunk grows very thick. Some of your older branches are dead. Animals often drill holes in them for homes. One fall day you feel many seeds on your branches. Breezes blow . . . many of the seeds float to the ground (sway in the wind and pretend to drop seeds).

You are a huge old tree that dies and falls to the ground leaving a big open space in the trees above (gently fall to the ground again). As the tree decomposes into soil it provides a home for animals and insects. Now, imagine that you are one of the new seeds from the big old tree (curl up in a ball) and you can get plenty of sunshine, rain, air, and fresh soil. It’s a new beginning and the cycle starts all over again!
*Note: The cycle on the right continues over and over until the tree dies. Once the tree dies, then it follows the cycle on the left.
<table>
<thead>
<tr>
<th>What do you see?</th>
<th>What do you smell?</th>
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<table>
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<th>What do you hear?</th>
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Field Study Data Sheet

Name_____________________

Tree Name_____________________

Date_____________________

Weather:

My Tree Has:

How Old is My Tree?:
Seed
Sprout
Sapling
Mature Tree
Dead Tree
Rotting Log

Observations:

Created by April VanderMolen for the Calvin College Ecosystem Preserve www.calvin.edu/go/preserve