



Trees and Keys Post-visit

Classroom Activities

Brief Synopsis

The importance of trees may be hard to see when we look at them. Students will identify, measure and age a local tree, then do research to find out how that specific tree species is important to people and how much longer they expect the tree to live. As part of a classroom discussion, students will calculate how long it would take to re-grow all of their trees. As an extension, students may research how many trees each of them needs each year in order to continue their American lifestyles.

Ages: Designed for 5th–8th grade

Time Considerations: Two 30-minute class sessions and time for independent research in between.

Materials:

- Chalkboard
- Worksheets (photocopies)
- Pencils
- Measuring tape (sewing-type)

Vocabulary: Alternate, Bud, Bud scale, Broadleaf, Conifer, Deciduous, Dichotomous, Entire, Lobe, Margin, Midrib, Opposite, Palmate, Petiole, Pinnate, Serrate, Simple leaf, Toothed, Whorled

Outcomes:

1. Students will be able to list many uses for trees.
2. Students will identify a local tree using a dichotomous key.
3. Students will use appropriate techniques to measure a tree and calculate its diameter and estimate its age.
4. Students will research a local tree species to find out its life expectancy and the many uses for its wood.

Minnesota Academic Standards:

Science: 4. IV. B.1&2, 6.I.B.3, 7.IV.B.4, 8.I.B.3

Math: 4.II.A.1,3&4, 4.II.B.5, 5.II.A.1&4, 5.II.B.1,4&5, 6.II.A.3, 6.II.B.3&4, 6.V.B.3, 7.V.B.1

Language Arts: 4.II.B.4, 4.II.D.1, 4.III.A.1, 5.II.B.4, 5.III. A.1, 6.II.B.3, 6.II.D.1, 6.III.A.1, 7.II.B.3, 7.II.D.3, 7.III.A.1, 8.II.B.3, 8.II.D.1, 8.III.A.1

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Set-up

During *Trees and Keys* class at Eagle Bluff we learned about the many uses for trees, each species providing wood, different from each other and better for some purposes than others. To help your students explore the specific importance of the trees around them, you will need to copy out the attached **worksheet**, **measuring tapes** (the soft flexible sewing type) and have students supply their own **pencils**. Your students will also need to have access to the **internet** or **tree identification books**.

Activity 1: Age of a Tree

Background: It is hard to go a day without using something we get from trees. The paper we write on, labels and other packaging, the furniture we sit and sleep on, as well as our own houses are some of the more obvious wood and paper products. But we depend on trees from more than just wood and paper. The air we breath is re-oxygenated and cleaned by trees, many of the fruits and nuts we eat come from trees, cleaning products such as pine oil, turpentine, rayon clothes, and cellulose sponges are all tree-based products.

Each tree offers different characteristics of wood, bark, and growth. In order to take advantage these differences we have to know how to identify each tree species and know some things about them. If we know how fast a tree grows and what kinds of things we can get from

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|-----------------|-------------------|-----------------|
| • Firewood | • Woodwork | • Cinnamon |
| • Furniture | • Maple Syrup | • Canoe Paddles |
| • Baseball bats | • Construction | • Boats |
| • Hockey sticks | (beams, etc.) | • Apples |
| • Tool handles | • Telephone Poles | • Avocados |
| • Paper | • Railroad Ties | • Walnuts |

them, we may be able to appreciate each tree around us.

Procedures:

1. Have the class brainstorm a list of things we get from trees. They may be able to recall some of the things they learned about in their *Trees and Keys* class at Eagle Bluff.
2. Write down the brainstorm on the board. It may look something like this:

Can we get all of these things from one type of tree? No, each

tree species is a little bit different, making each one good for different uses. How can you tell what kind of trees are living near you? Dichotomous keys of course!

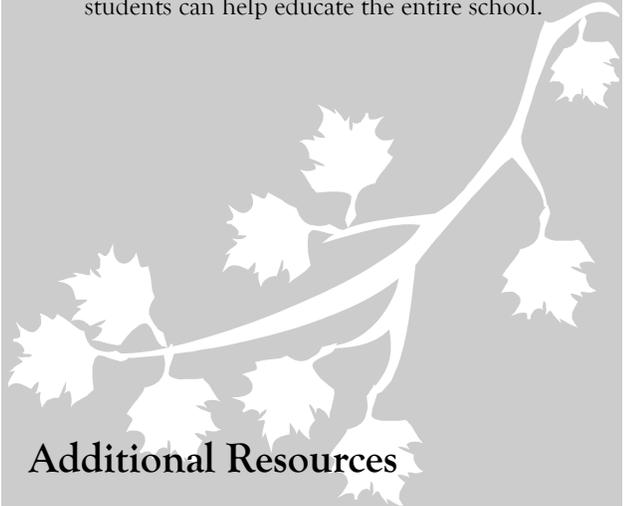
3. Divide the students to work together in pairs. They will be identifying, measuring and researching a tree in the schoolyard or their own neighborhood.
4. Before they locate their tree, have your students go online or to the library to check out an identification book for trees.
5. Have your students use the collected research materials and the included *Measuring Your Tree's Age* worksheet to identify their tree and measure it. They will be measuring the tree's circumference and using this measurement to calculate the tree's diameter and estimate the tree's age. If the species of trees your students are measuring are not listed in the *Tree Growth Factors* chart on the worksheet, they may need to do some additional research to discover the estimated growth rate for that species.

The goal is to have your students identify, measure, age the tree and decide:

- How much longer they expect the tree to live?
 - What year will it be when the tree starts to die of old age?
 - What benefits do we get from this kind of tree?
6. After your students have had a chance to research their trees and answer the questions on the worksheet, have a class discussion about their findings.
 - How old are the trees they each researched? Write their answers on the board to illustrate the general trend in the trees of your school yard. Is there a way to find out how old these trees are? Ask people in the neighborhood or call local conservation or park organizations for help. The school may have record of when the trees were planted. Are the student estimates close?
 - Do all the trees in your school yard grow at the same rate?
 - How long would it take for a new tree to grow as tall as each tree your class measured?
 - What does that tell you about how long it takes a forest to grow and for new trees to take the place of old ones?

Teacher Tips

- This project can be as simple or involved as you would like it to be. Feel free to adapt it to your needs.
- If you do not have access to a flexible measuring tape, use a length of non-stretching twine or long strips of paper to measure the around the tree and then compare that length to a ruler or yardstick to get the measurement in inches.
- If your school allows, find library or hallway space to display your students' reports, so each of your students can help educate the entire school.



Additional Resources

<http://www.arborday.org/trees/WhatTree.cfm?ItemID=E6A>

A website with an on-line identification key that can only be used if the tree has leaves at the time of identification. This key does not include twig identification.

<http://www.cnr.vt.edu/dendro/dendrology/ident.htm>

A website that allows you to identify your tree by its leaves or twigs on-line. You will have to select which key you would like to use (twig or leaf) and then select Minnesota (or other state) as the area the tree is living in.

<http://www.idahoforests.org/treestuf.htm>
A kid-friendly website listing tree products.

<http://www.atl.cfs.nrcan.gc.ca/index-e/what-e/publications-e/afcpublications-e/maritimetrees-e/tree-reference-e.html>

A website with a chart listing life expectancy for many common trees.

Measuring Your Tree's Age

Names: _____

Location: _____

Tree Species: _____

Current Year: _____

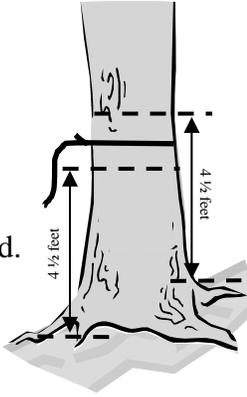
Tree's Circumference

You Will Need:

- Flexible measuring tape (like for sewing)
- A pencil and worksheet

Here's What You Do:

1. Measure the circumference of the tree 4½ feet up from the ground. If the tree is growing on a slope (hill) measure mid-way between the height from both sides of the tree.
2. Use the flexible measuring tape to measure the circumference of the tree trunk, holding the tape snugly to measure.
3. Record your measurement to the right.

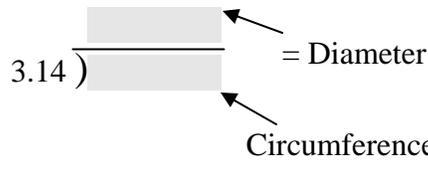


Circumference: _____ (inches)

Tree's Diameter

To calculate the diameter:

Divide the circumference by 3.14 (pi)



Diameter: _____ (inches)

Tree's Age

To calculate the age of the tree:

Multiply the diameter in inches by the growth factor found in the table to the right

$$\frac{\text{Diameter}}{\text{Diameter}} \times \frac{\text{Growth Factor}}{\text{Growth Factor}} = \frac{\text{Age of Tree}}{\text{Age of Tree}}$$

Estimated Age: _____ (years)

Tree Growth Factors

Tree Species	Growth Factor
American Beech	6.0
American Elm	4.0
Aspen	2.0
Basswood	3.0
Black Cherry	5.0
Black Walnut	4.5
Cottonwood	2.0
Dogwood	7.0
Green Ash	4.0
Ironwood	7.0
Pin Oak	3.0
Red Oak	4.0
River Birch	3.5
Shagbark Hickory	7.5
Silver Maple	3.0
Sugar Maple	5.0
White (Paper) Birch	5.0
White Ash	4.0
White Oak	5.0
White Pine	4.5

Research information about your tree and answer the following questions:

- How much longer do you expect the tree to live?
- What year will it be when the tree starts to die of old age?
- What benefits do we get from this kind of tree?