

Title: It's Not Called Penn's Woods for Nothing

Audience: 6 grade science

Duration: 4 -40 minute periods

Objectives:

Students will:

- ✓ Describe the parts of a tree and explain how each part works.
- ✓ Discuss the movement of water through a tree.
- ✓ Use a dichotomous key to identify trees.
- ✓ Identify the functions of stems.
- ✓ Identify the parts of a tree and use the information to determine the age of the plant.

Process Skills:

- Discuss
- Identify
- Describe
- Classify

Standards:

Science and Technology

3.3 Biological Sciences

3.6 Science, Technology and Human Endeavors

Environment and Ecology

4.2 Renewable and Nonrenewable Resources

4.6 Ecosystems and their Interactions

4.8 Humans and the Environment

Science

S.A.1 Reasoning and Analysis

S.4.A.1.2 Recognize and describe changes in natural or human-made systems and the possible effects of those changes.

S.A.3 Systems, Models, and Patterns

S.4.3.1 Identify systems and describe relationships among parts of a familiar system

S.4.A.3.3 Identify and make observations about patterns that regularly occur in nature

S.B.3 Ecological Behavior and Systems

S.4.B.3.2 Describe, explain, and predict change in natural or human-made systems and the possible effects of those changes on environment.

Math

MA.3 Compute accurately and fluently and make reasonable estimates.

ME.1 Formulate or answer questions that can be addressed with data and/or organize, display, interpret, or analyze data.

Materials:

Hand lens

Tree cookies

Pencil

Colored pencils-1 set per group

Large sheets of paper-1 per group

Copies of activities from the hyperlinks included within the lesson plan

A downloaded copy of Robin Walling's Tree Song

Scissors

1 Hammer per group of students

1-4 inch square wood block per group of students

Thumb tacks

1-4" X 4" white cotton fabric per student

Slips of paper-1 per student

Iron (optional)

Vinegar (optional)

Spray bottle (optional)

Anticipatory Set:

Tree Song

Science Song Lyrics

Robin Walling

This song is available on Robin Walling's

[Science In Song III: Animal Kingdoms](#)

Procedures:

1. Discuss the characteristics of trees. (Most trees are taller than other plants and have one main woody trunk that supports the entire tree. Trees also live longer than other plants. Trees are typically perennials, living for many seasons.)
2. Discuss the classification of trees. (Trees are classified according to how they reproduce, what type of flowers and seeds they have, how they grow, as well as how they are structured. Gymnosperms are plants that produce fruit that is not enclosed in a fruit. In most gymnosperms, the seeds are produced on the surface of the scales)

- of the female cone and are pollinated by the wind. Conifers are the most common type of gymnosperm. Angiosperms are flowering plants that bear their seeds in fruit.
3. Explain that foresters typically call broad-leaf trees “hardwoods” since the trees typically have harder wood than the needle-leaf trees.
 4. Use the following link to access a leaf classification activity using a dichotomous key http://www.exploringnature.org/graphics/tree_key.pdf Ranger Rick’s Naturescope: Trees are Terrific also contains a leaf classification activity using a dichotomous key.
 5. Explain the five main layers of the tree and their functions:
 - a. The Trunk- provides the tree with its shape and strength as well as acts as the central “pumping system” carrying water and minerals from the roots to the leaves, and food in the form of glucose from the leaves down to the branches, trunk, and roots. The outer layer of the trunk is also referred to as the outer bark, which protects the tree from injury and disease.
 - b. Next to the outer bark is the inner bark or phloem. Phloem is a thin layer that acts like a food supply line from the leaves to the rest of the tree. Sap travels down from the leaves through channels in the phloem providing all the parts of the tree with food.
 - c. The Cambium is located next to the phloem and is one of the growth layers of the tree, producing new cells during the growing season. It is the cambium that makes the tree trunk, branches, and roots grow thicker.
 - d. The sapwood or new xylem is made up of the youngest layers of wood. The sapwood is a network of thick-walled cells that carry water and minerals up the tree from the roots to the leaves as well as other parts of the tree. The sapwood also stores nutrients and transports them from one part of the tree to another.
 - e. The heartwood is old xylem that no longer transports water and minerals. The heartwood is often much darker than the sapwood. It is the heartwood that gives the tree support.
 6. Use the following link to connect to activity 76: Tree Cookies <http://www.learnoutside.org/familyactivities.html>
 7. The following link can be used to access “Tree Ring Science” http://www.pbs.org/wgbh/nova/teachers/activities/pdf/2817_methusel_01.pdf Ranger Rick’s Naturescope: Trees are Terrific! Also has a great activity on pages 23-24 entitled “Reading the Rings” where students describe how events in the life of a tree can affect the growth of its annual rings
 8. Use the following link to access an activity to construct <http://www.portblakely.com/pb-tree-farms/environmental-education/teachers/handouts/parts-of-a-tree>
 9. Explain that leaves use carbon dioxide from the air, water from the roots, and the sun’s energy (in the form of sunshine) to produce sugar (glucose). This food making

process is called photosynthesis. Photosynthesis can take place only when chlorophyll is present. Explain that chlorophyll is the green pigment found in green plants.

10. Use the following link to access an activity pertaining to photosynthesis
<http://www.arborday.org/kids/beataleaf.pdf>
11. Inform the class that they will assume the role of the following: leaves, bark, phloem, cambium, sapwood, heartwood, and roots.
12. Select a tall student to play the role of the heartwood. This student should cross their arms and stand in the center of a large area.
13. The student playing the taproot should be seated at the foot of the heartwood. (This person represents the deep taproot.)
14. Select 2 students can play the lateral roots. These students should lie on their backs, spreading out from the taproot with their feet toward the heartwood. These students will make slurping sounds!
15. Select 2-3 students to represent the sapwood. These students join hands to make a ring around the heartwood. They should be positioned between the lateral roots and face toward the heartwood. (These students should pretend to draw water from the roots by raising and lowering their joined hands above their heads.)
16. Select 4-7 students to represent the cambium. These students also join hands and form a large circle around the sapwood. (These students should chant, “we make new cells, we make, new cells.”)
17. The 7-8 phloem students also join hands and form a larger circle around the cambium. These students should pretend to the transporting food down from the leaves by holding their arms above their heads, then lowering them and raising them again.)
18. The remaining students will represent the outer bark. These students form a circle around the entire tree, face outward and hold hands.
19. Once everyone is in position, ask the students to go through their motions: the roots taking water up from the soil, the sapwood transporting the water up the trunk to the branches and leaves, the phloem carrying food down from the leaves to the trunk and roots, and the cambium chanting, “We make new cells”.
20. Afterward, lead a short discussion about the different parts of the tree to make sure everyone understands what each part does.
21. Invite a forester to speak to the class about the importance of trees.

Closure:

1. Divide the class into seven groups and assign each one of the following seven tree parts: heartwood, taproot, lateral root, cambium, phloem, outer bark, and lateral root.

2. Ask them to draw a picture or diagram to illustrate what their tree part does to help the tree grow.
3. Then have each group share and explain their illustration to the rest of the class.

Sources:

- Songs for Teaching™
Using Music to Promote Learning
6632 Telegraph Rd. #242
Bloomfield Hills, MI 48301
- Project Learning Tree
- Ranger Rick's Naturescore: Trees are Terrific!
- <http://www.doc.govt.nz/publications/getting-involved/for-teachers/outdoor-and-classroom-activities/build-a-tree-activity/>
- Amsel, Sheri. "Tree Activities." Tree Identification - Advanced Dichotomous Key for All Trees. Exploring Nature Educational Resource. © 2005 - 2011. July 26, 2011.
<<http://exploringnature.org/db/detail.php?dbID=3&detID=2829>>