

Big Tree, Little Tree

Wyoming Science, Mathematics

Objectives:

- Identify the four parts of a tree.
- Measure objects and record data.
- Explain and use circumference, length, and height.
- Construct a bar graph and explain the data.

Background:

There are three main parts of the tree. These parts are the trunk and branches, the leaves, and the roots. The trunk, branches, and roots of a tree contain heartwood, xylem, cambium, phloem, and bark. The heartwood is the center of the tree and gives the tree support. Heartwood is old xylem and no longer transports water and minerals. The xylem carries water and minerals to the leaves from the roots. The cambium is a thin layer of tissue that surrounds the xylem. The cambium grows to make the trunk, branches, and roots grow thicker. The phloem is soft tissue in a layer surrounding the cambium. The phloem transports food made by the leaves to other parts of the tree, including the roots. The outer layer, or the cork layer, is called the bark. The bark, which is hard, dead tissue, protects the living inner parts of the tree. The bark also stretches to let the trunk and branches grow thicker, although on most trees the bark does not easily stretch. As the branches and trunk grow, they push against the bark and eventually some of the bark will crack and dry to become rough.

Trees help our environment in many ways. Trees act as windbreaks to protect houses and buildings and to keep the wind from blowing the topsoil away. The roots of trees help prevent soil from being washed away during heavy rains because the roots and root hairs hold the soil in place. Trees also help to make soil. The leaves turn into organic matter in the soil and roots break soil and rocks down into smaller pieces. Forests provide a sheltered environment for wildlife, and forests in mountain regions prevent snow from sliding down and causing avalanches.

Trees also add water to the air. Not all of the water trees absorb is used to make food for the tree. Most of the water is lost through transpiration, which puts water back into the air. This added moisture to the air helps to make rain.

Activity Procedures:

Put the students into groups of two to five. For this activity, you will be measuring trees in the schoolyard or a nearby park. Each group will be measuring one tree so you can have as many groups as there are trees. Before beginning the measuring, label each tree with a number to identify trees later on. (You may also do this activity as a class.)



Standards

Science

Life Systems: 1.1, 1.3

Science As Inquiry: 2.1, 2.2A, 2.2B, 2.2C, 2.2D, 2.2E

Mathematics

3rd Grade:

Measurement: 3.1

Number Operations &

Concepts: 1.1, 1.2, 1.6, 1.8

Geometry: 2.1

4th Grade:

Measurement: 3.1, 3.4

Number Operations &

Concepts: 1.1, 1.2

Geometry: 2.1

Materials

- "Tree Measurements" worksheet
- String
- Paper
- Pencil
- Yardstick

Estimated Time

90 Minutes

Grades 3-4

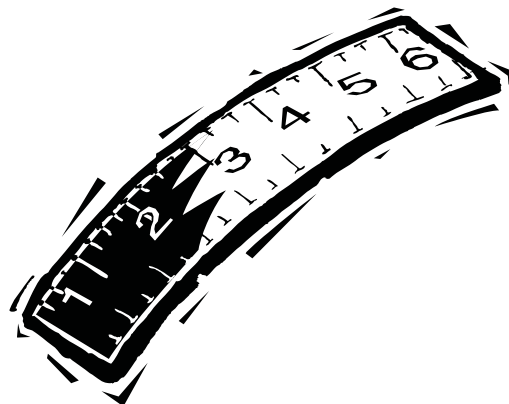
notes:

Have each group conduct the following measurements: Record these measurements on the “Tree Measurements worksheet.

- **Circumference:** Measure from the ground to 4 1/2 feet high on the trunk of the tree. At this height, measure the circumference of the tree’s trunk. Wrap the string around the trunk, mark where the string meets, and then measure the length of the string (to the mark). Record the circumference of the tree to the nearest inch.
- **Crown:** Next, find the tree’s longest branches. Place a marker on the ground beneath the tip of the longest branch. Find the branch opposite to this branch, on the other side of the trunk. Place a marker on the ground beneath its tip. Measure the distance between the first marker and the second marker. Measure in feet and round the answer to the nearest foot. Record the length of the tree’s crown.
- **Height:** Have one person stand at the base of the tree with the yardstick vertically in front of him/her. Holding the yardstick vertically, and keeping his/her arm straight, have him/her back away from the tree until the tree and the yardstick appear to be the same size. Have the second person measure how many feet there are between the tree trunk and the person holding the yard stick. This is the height of the tree. Round the answer to the nearest foot and record it.

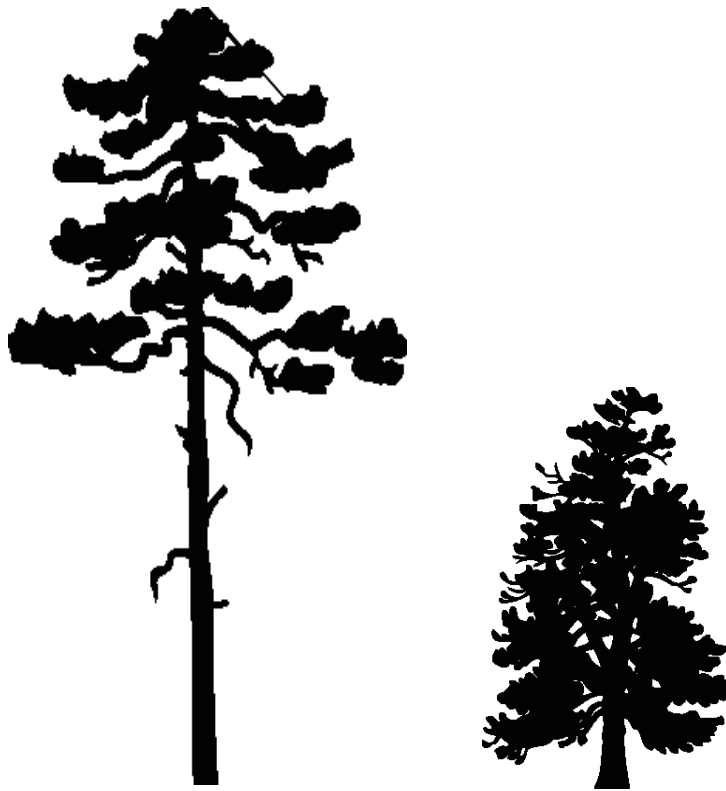
Make sure all the students understand how to measure the circumference, crown, and height. Check to see if their numbers are realistic compared to other groups. Some re-measuring may have to be done.

Back in the classroom, have each group make a bar graph of its tree’s measurements. Display the graphs together on a bulletin board.



More Activities,

1. Use the Tangent Height Gauge for Trees (item # 158) available in the Natural Resources Discovery Tool Chest to as an additional measurement tool to incorporate geometric concepts (can be ordered from the WAIC website).
2. Measure other objects, graph the data, and compare the information.
3. Invite a Conservation District employee or forester into the classroom to further discuss the importance of trees (For a list of possible contacts in your area contact WAIC).
4. Find a location in the school yard that needs a tree and have the class plant a tree.



Teaching Tip:

Keep the measurements of the trees from this year.

Next year have your class measure the same trees and compare the differences in the trees' heights, trunk sizes, and circumferences.

vocabulary:

- *circumference*
- *vertical*
- *crown*
- *organic*
- *environment*
- *top soil*
- *trunk*
- *heartwood*
- *xylem*
- *cambium*
- *phloem*
- *bark*

Tree Measurements

Conduct the following measurements in groups:

1. **Circumference:** Measure from the ground to 4 1/2 feet high on the trunk of the tree. At this height, measure the circumference of the tree's trunk. Wrap the string around the trunk and then measure the length of the string. Record the circumference of the tree to the nearest inch.

My tree's circumference is: _____ inches



2. **Crown:** Find the tree's longest branches. Place a marker on the ground beneath the tip of the longest branch. Find the branch opposite to this branch, on the other side of the trunk. Place a marker on the ground beneath its tip. Measure in feet and round the answer to the nearest foot. Record the length of the tree's crown.

My tree's crown is: _____ feet



3. **Height:** Have one person stand at the base of the tree with the yardstick vertically in front of him/her. Holding the yardstick vertically, and keeping his/her arm straight, back away from the tree until the tree and the yardstick appear to be the same size. Have the second person measure how many feet there are between the tree trunk and the person holding the yardstick. This is the height of the tree. Round the answer to the nearest foot and record it.

My tree's height is: _____ feet.

