Measuring Trees

From Community Tree Contest

National Arbor Day Foundation
www.arborday.org/programs/teacherActivity.html

Foresters have a special formula to measure trees. This formula includes the tree's height, circumference, and crown spread. A tree receives one point for every foot of height, one point for every inch of circumference (taken at 4 1/2 feet), and one-fourth of a point for every foot of average crown spread.

Explain to the students that they are going to practice measuring trees before looking for a "Tree-mendous Tree" winner. Divide students into groups of three or four. Each group will need measuring tape, yardstick, and a pencil and paper to record their findings.

It may be helpful to assign roles to each student within a group. Group jobs include:

Recorder - records measurements and tallies points
Investigator - takes the measurements
Manager - assists the investigator to make sure measurements are accurate and is responsible for the measuring tape and yard stick
Reporter - reports findings to class

Take students to a nearby area with enough trees to allow each team to measure a tree. Explain that they are measuring these trees for practice and later they will search for the “Tree-mendous Trees” in their community.

Height

The height of a tree is measured from the top of the tree to the ground. Follow these steps to measure tree height:

STEP 1 - Students should stand on level ground to take measurements.

STEP 2 - The student investigator extends his/her arm out straight so that the top of his/her fist is at eye level. Carefully using the yardstick, the manager makes sure the top of the investigator's fist is at eye level and then measures the distance from the investigator's fist to the investigator's eye. The recorder writes down this information.

STEP 3 - The investigator directly faces the tree to be measured holding the yardstick vertically in his/her extended fist so that the distance from the top of his/her fist to the top of the yardstick is the same eye-to-fist distance measured in the previous step. The manager checks the measurement then makes sure the investigator's arm is straight out, fist at eye level with the yardstick straight up and down.

STEP 4 - The investigator slowly (and carefully) walks backward away from the tree until he/she can see the base of the tree by looking over the top of the fist and the top of the tree by looking over the top of the yardstick.

STEP 5 - The manager measures the distance, in feet, from the investigator to the tree. This distance is the height of the tree.

STEP 6 - The recorder writes down the height measurement and gives the tree one point for every foot of height.

Circumference

The circumference of a tree is the distance around its trunk. The circumference is measured 4 1/2 feet from the ground. If the tree forks or if there are branches at the 4 1/2 foot mark, the circumference is measured at the narrowest point below the 4 1/2 foot level.
Follow these steps to measure circumference:

STEP 1 - The investigator holds one end of the tape against the tree trunk at a measured point 4 1/2 feet above the ground.

STEP 2 - The manager wraps the tape around the trunk until it reaches the starting point.

STEP 3 - The investigator reads off the measurement in inches. This is the circumference of the tree.

STEP 4 - The recorder writes down the circumference and gives the tree one point for every inch of distance around the trunk.

Crown Spread

The crown spread of a tree is the distance its branches spread away from its trunk. The crown spread is calculated by measuring the distance of the widest spread and the distance of the narrowest spread. These two figures are then added together and divided by two to get an average. A tree receives 1/4 of a point for every foot of the average crown spread. Follow these steps to measure crown spread:

STEP 1 - The investigator finds the branch that sticks out the farthest from the trunk and stands directly under its tip.

STEP 2 - The reporter goes to the opposite side of the tree and stands under the tip of the branch extending farthest out on that side.

STEP 3 - The manager measures the distance in feet between the investigator and the reporter and the recorder records this number. This distance is the widest point of the crown spread.

STEP 4 - Next the investigator finds the branch nearest the trunk of the tree and stands directly under its tip.

STEP 5 - The reporter goes to the opposite side of the tree and stands under the tip of the branch closest to the trunk on that side.

STEP 6 - The manager measures the distance in feet between the investigator and the reporter and the recorder records this number. This distance is the narrowest point of the crown spread.

STEP 7 - The recorder adds the two distances together and divides by two to get an average crown spread. The recorder then awards the tree 1/4 of a point for every foot of average crown spread.*

* If students have not yet studied fractions the teacher may wish to instruct the students to divide the average crown spread by 4.

Measuring Up a Winner

Before starting the "Tree-mendous Trees" contest:

- Review conifer and broadleaf distinctions.
- Make sure students understand how to correctly measure a tree.
- Inform the community of the project so people will not be surprised to see the kids in their yards.
- Ask for parental volunteers to accompany the students.
- Determine how the students will get to the designated area or areas to measure trees. Make necessary transportation arrangements.
- Create a form for the student recorders to use in their record keeping. The form should include:
    - The formula for measuring tree size
    - Room for students to describe the location of the tree. If you are measuring trees in neighborhood yards, students can record the house address where the tree is located. If you are measuring trees in parks, students will need to write down a brief description of each tree's location along with some distinguishing characteristics of each tree. In all cases, students should differentiate whether the tree is a conifer or broadleaf.

When you are ready to begin, give each group a recording form. Make sure they have something firm to write on and pencils to record their results. Check with each group manager to see that they have a tape measure and yard stick.

Establish an organized system for groups to explore the designated area or community. When students return to the classroom, have each group reporter report their findings to the class and compile results.

Have students put together a list of the community's biggest trees. Interested students may wish to do research to learn more about winning tree species and share their results with the class.

After determining the "Tree-mendous Trees" contest winner(s), your class may wish to present an award certificate to the owner of the tree if it is on private property. Or, make a presentation to the mayor or city council if the tree is on public property. Announce the tree winners on Arbor Day. Include a visit to the winning tree(s) as part of your school's Arbor Day celebration.