

MEASURING TREES

At 275 feet (82.5 m) high and 80 feet (24 m) in circumference, the biggest sequoia in California is also the biggest tree in the United States. It is one of the more than 650 "champion" trees in the nation. Biologists and botanists don't have to climb the trees to find out how tall they are...here's how they do it.

Materials

- Tape measure
- Paper and pencil
- Yardstick
- Tree field guide

Time: 45-50 minutes

Divide the students into teams of two or more students.

Measuring Circumference

The circumference is the distance around an object. The circumference measurement of a tree is taken around the trunk at a height 4.5 feet up the trunk from the ground.

To measure the circumference, have one person hold the beginning of the tape measure, and have the other person walk around the tree playing out the tape.

If the students are not tall enough to measure 4.5 feet up the trunk, or there are branches at that point, measure the thinnest point below that point.

Measuring Height

The height of a tree is measured from the ground up to the topmost twig, approximated to the nearest foot (30 cm).

Work in teams. A couple of students in each team must stay on level ground as they follow the directions to measure the tree's height.

1. Hold your arm out in front of you so that your fist is at eye level. (Your arm should not be at all bent.) Have another team member measure the distance from your fist to your eye (be very careful doing this part!).
2. Face the tree to be measured. Hold a yardstick so that the distance from your hand to the top of the stick is the same as the distance from your extended fist to your eye. For example, if your extended fist is 2.5 feet away from your eye, then you must

hold the yardstick at 30 inches. Make sure that your arm is straight, and that the stick is being held perfectly straight, not tilted at an angle.

3. Walk backwards away from the tree until you can see the base of the tree by looking over the top of your fist, and at the top of the tree by looking over the top of the yardstick. Don't move anything but your eyes!
4. When you can see the tree completely by sighting over the top of the yardstick and the top of your fist, have the other team members measure the distance between you and the tree. This distance is the approximate height of the tree.

Measuring the Crown Spread

The crown spread of a tree is the distance its branches spread away from its trunk. The measurement is approximated to one foot (30 cm) and is usually taken as an average.

1. Have the students find the branch that sticks out the farthest from the trunk of the tree. Have one student stand directly under the tip of the branch.
2. Have another student go to the opposite side of the tree, and find the branch that sticks out the farthest on that side. When that branch is found, the student should stand under its tip.
3. While they are both facing the tree, have each student take one or two steps to the side of the trunk so that the distance may be measure between them without having the trunk of the tree in the way; one student will step to her right, the other to her left so that they both end up on the same side of the tree.
4. Have the other students measure the distance between them.
5. Repeat steps 1 through 4, looking this time for the shortest branches.
6. To get the average crown spread, the two distances are added together and divided by two.

Additional Activities

Champion trees are determined using a formula: height + circumference + 1/4 crown = point total. The tree of a particular species that has the most "points" (the highest number) is considered the champion. If two trees are within five points of each other, they are listed as co-champions. If a tree is close but not quite big enough to "tie" or beat the champion, it is placed on a special "challenger trees" list. All champion and challenger trees are listed in the National Register of Big Trees maintained by the American Forestry Association.

Because people keep searching for bigger trees, and because sometimes champions lose points (a branch gets knocked down by a storm, for example) the list is constantly changing.

1. Measure the trees around the school or neighborhood. Create a list of champions, by height and by species. Use your field guide to identify the different types of trees.
2. Measure your trees annually. Has the championship passed to another tree? What happened to the tree that lost points? How fast are the trees growing? What seems to affect their growth or lack of growth (heat, rain, insect infestation, other plants, etc.).
3. The American Forest organization keeps the National Registry of Big Trees. See how your school's champions compare to the current Big Trees by going to the Big Trees registry at www.americanforests.org/resources/bigtrees/register.php

More Tree Resources

American Forests

www.americanforests.org

Enature.com's Online Field Guides

www.enature.com ⇒ Trees