
Forestry



District & State 4-H O-Rama
Junior & Senior 4-H'ers



OBJECTIVES

Targeted Life Skills: wise use of resources, marketable skills, self-motivation, and decision-making

To develop a greater understanding and appreciation of forest resources.

To learn skills useful in dendrology and forest mensuration that are applicable to college courses required for degrees in forestry and natural resources.

That the opportunity will be provided for faculty to share information about related college degree programs in forestry and natural resources, along with associated career paths.

ACTIVITY

Participants – This is an individual activity. Up to 3 Junior and Senior 4-H'ers from each county may participate in the District 4-H O-Rama.

The top seven Senior members from each District 4-H O-Rama may participate in the Arkansas 4-H O-Rama.

Awards – At the District O-Rama's, the first place Junior and first place Senior will receive trophies. Second-, third-, fourth- and fifth-place winners will be awarded ribbons. Contestants who place below fifth will receive participation ribbons. Awards will be the same, for Seniors only, at the Arkansas 4-H O-Rama.

Training – Participants should receive training in:

1. **Identifying forest trees by common names.** The primary reference is *A Key to Common Trees of Arkansas*, MP 344, available from your county Extension office. Other useful references include *Trees of Arkansas*, by Dwight M. Moore, for sale by the Arkansas Forestry Commission, 1 Natural Resources Drive, Little Rock, AR 72205 or <https://www.aad.arkansas.gov/arkansas-forestry-commission> and *A Guide to Southern Trees*, by E.S. Harrar and J. G. Harrar, Dover Publications, Inc., available from bookstores.

2. **Use of the scale stick as described in the attached *Measurement of Standing Trees Study Guide*.** (Scale sticks for county use are available from the Extension foresters. 4-H members need to bring their own scale stick if at all possible.)
3. **Characteristics of forest trees.** Reference is *A Key to Common Trees of Arkansas*, MP 344.

Competition – At the District and Arkansas 4-H O-Rama's, up to 15 trees located outside at the event or in case of rain 15 fresh or mounted specimens will have been selected prior to the event. As appropriate for each tree or specimen, participants will be required to give:

1. **The common name of up to 15 trees.** The common name must be one of those listed for the species in *A Key to Common Trees of Arkansas*. Example: shortleaf pine. (3 POINTS EACH, UP TO 45 POINTS POSSIBLE)
2. **The diameter of up to 5 trees.** Diameters will be rounded to the nearest two-inch class (6, 8, 10, 12 inches, etc). For example, a tree measuring more than 11 inches but less than or equal to 13 inches is a 12-inch tree. (A tree exactly 13 inches in diameter is still in the 12-inch class.) The 14-inch class includes all trees that are at least slightly larger than 13 inches and at most not more than 15 inches, and so on. (3 POINTS EACH, UP TO 15 POINTS POSSIBLE)

Diameter is measured at breast height (4½ feet above the ground). (If a tree is on a slope, think of breast height as a circle around the tree that is 4½ feet above the ground on the uphill side of the tree. That means it'll be more than 4½ feet above the ground on the downhill side of the tree.)

In measuring tree diameters, it is essential that you use the side of the scale stick that says "Diameter of tree" and not the side that says "Diameter of log". Although the contest coordinators will have scale sticks for contestants, contestants should bring their own scale stick. If you provide your own scale stick, you may wish to mark the tree diameter side with a highlighter pen or in some other way.

3. **The merchantable height of up to 5 trees.** Measure merchantable height in logs and half-logs. Always round down to the nearest ½ log. For example, if the merchantable height of a tree is almost 2 logs but not quite, you call it 1½ logs. This is consistent with actual practice in timber cruising. (3 POINT EACH, UP TO 15 POINTS POSSIBLE)

The scale sticks that the judges provide will have half-log marks drawn on them. If you want to use your own stick, you may wish to make half-log marks midway between the log marks that are printed on the stick.

4. **Characteristics of forest trees.** Optional, depending on the time available. This could be used to break ties. The judge may end the contest with a list of questions which could be answered with the names of trees; e.g.: Which trees have opposite, compound leaves? Which group of oaks has bristle-tipped lobes? Which conifer has foliage that falls off in winter?)

Score cards – Contestants will turn in a separate card for each tree. Cards will be provided by the judge.

Tree # _____ Contest # _____

Name of Tree _____

Diameter of tree _____ Inches _____

Height of tree _____ Logs _____

Example of Forestry-Timber Estimating Score Card

ANSWERS TO FREQUENTLY-ASKED QUESTIONS

1. Trees to be identified will be selected from the 60 species listed in *A Key to Common Trees of Arkansas*, MP 344.
2. The judges try to make sure that any tree on the contest is common throughout the district, so that all contestants would have had a good chance to see and learn it. A tree might be included in one district, where it is common, but not in another district, where it is seldom seen.
3. In a runoff, the judge might have to include some uncommon or minor species in order to break the tie. Still, the judge will try to select species that the runoff contestants have an equal chance of knowing, considering where they reside in Arkansas.
4. At the Arkansas 4-H O-Rama, the judges may choose any of the 60 trees listed in *A Key to Common Trees of Arkansas*, MP 344.
5. *A Key to Common Trees of Arkansas*, MP 344, gives a standard common name or names for each species. The common names given as answers in the contest must be the ones used in the reference.

The common name must be complete enough to apply to only one tree. For example, the contestant would not get full credit for "oak". Likewise, "red oak" could be either southern red oak or northern red oak.

The judges may make exceptions. For example, the judge may accept "hickory" if the tree is one of the hard-to-identify species and no fruit is present. The judge will announce in advance if a complete name is not required for a particular tree.

6. Partial credit may be given for tree identification. For example, a person who answers "redbud" when it is really an "Eastern redbud" will get 1 point credit.
7. No partial credit is given for tree diameter and tree height measurements. However, the judge will keep in mind the limits of accuracy of a scale stick. If, for example, a tree measures exactly 11 inches in diameter, the judge will either not include it on the contest or else will announce that rounding either up or down will be accepted as a correct answer on that tree.
8. **Participants must show up for the contests on time. This is an outside event and we can- not give a written test or take someone back through the contest because they are tardy.**

PREPARED BY

Kyle Cunningham – Assistant Professor of Forestry

Note: Participation in this 4-H activity should be reported under forestry, conservation, achievement, or agriculture for county, state or national awards.

MEASUREMENT OF STANDING TREES STUDY GUIDE

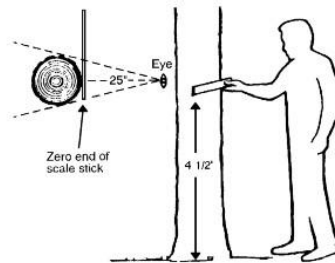
By

Dr. Kyle Cunningham, Assistant Professor of Forestry

Since a tree is shaped like a cylinder, its volume may be determined by measuring its diameter and height. Diameter of standing trees is measured by time-honored custom, at $4\frac{1}{2}$ feet above ground on the uphill side of the tree. This is abbreviated as DBH (diameter breast height.) The way to determine diameter will be explained in detail later. Height of a standing tree might be measured as total (the entire height from ground line to the top) or merchantable. Merchantable height varies, depending on the product that might be cut. The top diameter is fixed by certain specifications. If a tree is to be cut into logs, its height usually will be measured in 16-foot logs to the nearest full half-log.

Tree diameters can be measured by using several different instruments: a tree caliper, diameter tape or tree scale stick. There are even more advanced methods also available today. We want you to learn starting with the basics. Therefore, the tree scale stick is used in the contest, and the method of using it is explained in the following section.

The drawing below shows how the tree scale stick is used to find tree diameter. Use the flat side of the stick, which reads, "Diameter of Tree (in inches)." The instrument on this side of the tree scale stick is called a Biltmore Stick. Hold the stick level at 25 inches from the eye, against the tree, at a height of $4\frac{1}{2}$ feet above ground on the uphill side of tree. Practice is needed to find both the $4\frac{1}{2}$ foot point in relation to your height, and the 25-inch distance from your eye. When the stick is placed perpendicular against a tree, close one eye, sight at the left or zero end. This and the tree bark should be in the same line. Now, DO NOT MOVE YOUR HEAD. Just move your eye across the stick to the right hand edge of the tree. Read the tree diameter to the nearest even inch in 2 inch spacing's (10, 12, 14 inches, etc.).

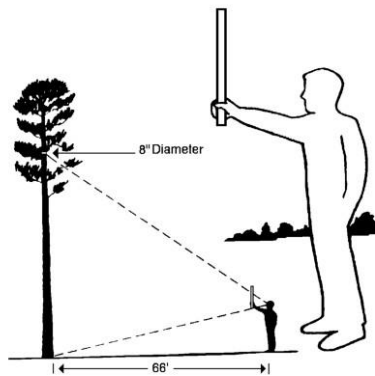


Use of a tree scale stick to estimate tree diameter
 $4\frac{1}{2}$ feet above the ground.

To measure the merchantable height of a tree, pace out 66 feet from the base of the tree, to a point where the entire tree can be seen. It is a good idea to stay on the same contour as the tree, rather than up or down hill from it. Hold the tree scale stick so that the edge of the stick that reads "Number of 16-foot logs" faces you. The instrument on this edge of the tree scale stick is called a Merritt Hypsometer. The zero end should point toward the ground. Hold the stick straight up and down at 25 inches from your eye. Sight the zero end to appear to rest at stump height, about 12 inches above the ground. DO NOT MOVE YOUR HEAD OR THE STICK. Look

up the stick to the merchantable height of the tree. (Merchantable height is the height at which the diameter is reduced to 8 inches or just below the first major fork or other major defect.) Read the merchantable height to the nearest full half-log. If the merchantable height is slightly more than $2\frac{1}{2}$ logs, you can record it as $2\frac{1}{2}$ logs. But, if the merchantable height is slightly less than $2\frac{1}{2}$ logs, you must record it as 2 logs. So, always round "down".

Practice on pacing is needed to find the 66-foot distance from the tree. Stretch out a tape 66 feet in length and record the number of paces to reach from 0 to 66 feet. A pace is actually every time your right foot touches the ground. This method is more accurate than counting every step you take. Side-note: you can divide the number of paces you take by 66 and get your "pace length". The 25-inch distance from your eye to the stick in height measure is still the same as in measuring tree diameter.



Use of a tree scale stick to estimate merchantable height.