

Oklahoma 4-H Forestry Judging Manual



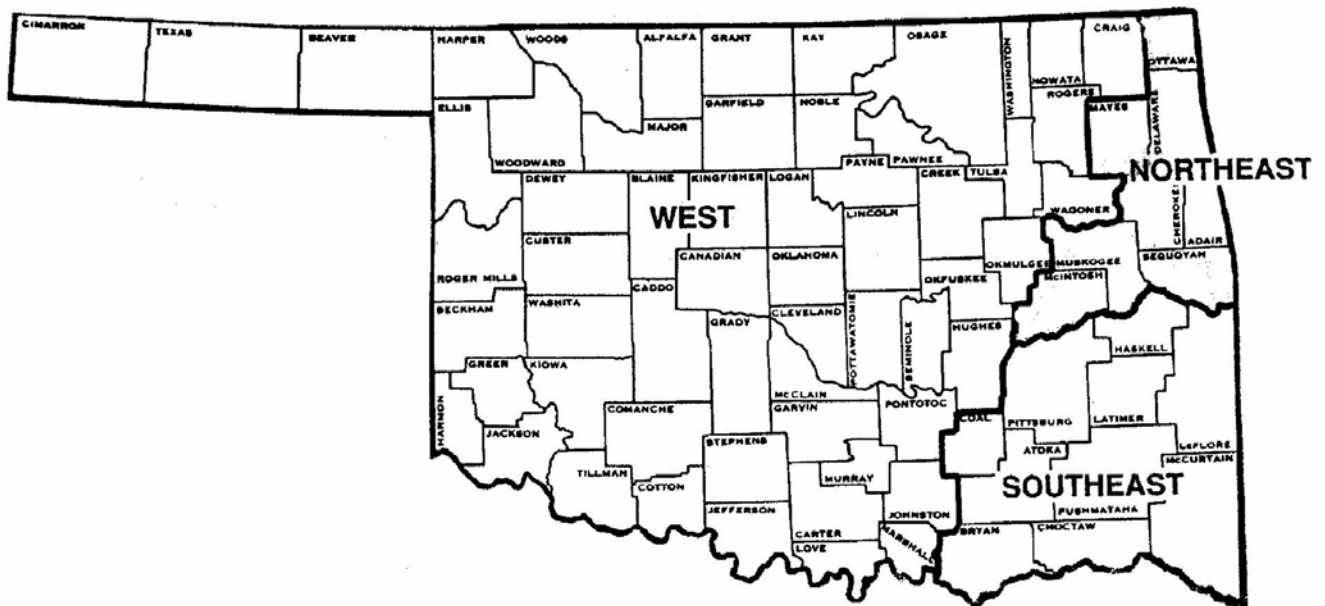
OSU EXTENSION
4-H YOUTH DEVELOPMENT

INTRODUCTION

There are more than 750 million acres of forested land in the U.S. Approximately 10 million of those forested acres are located in Oklahoma. This equates to about 20% of Oklahoma's land. A majority of this forestland is located in the 18 easternmost counties of the state. These areas are where 4-H members can establish a basis in forestry knowledge and develop an interest in forestry careers.

Every year, each Oklahoman uses the equivalent of a 100-foot tall, 18-inch diameter tree in the form of paper, lumber, fuel, and a variety of other products. Today, forestry is an \$80+ million a year industry in Oklahoma. Value added forestry products made in Oklahoma would increase that figure by nearly 3-fold. Additionally, forest grazing and forest wildlife are important economic resources to Oklahomans who engage in hunting, fishing, livestock production, and various non-consumptive outdoor recreation activities. The estimated value of these non-timber resources is believed to exceed \$600 million.

Map of Oklahoma Counties (Commercial Forestland is in 18 counties in Northeast and Southeast Oklahoma)



OBJECTIVES

The objectives of the Oklahoma 4-H Forestry Judging Contest are to provide the opportunity and atmosphere for 4-H forestry members to:

1. Develop leadership talents and to work toward achieving character development and effective citizenship;
2. Develop desirable attitudes toward the need and importance of conserving woodlands as a source of income, raw materials, wildlife habitat, and recreation important for quality living;
3. Acquire an understanding of practical forestry skills in forest management and the utilization of forest and wood products.

In addition to meeting these objectives, the judging contests will encourage and promote better forestry knowledge for 4-H members, volunteer leaders, and Extension agents at local, county, district, and state levels. As future voters, decision-makers, and leaders, 4-H'ers participating in this program will learn the complexities and trade-offs involved in managing woodland for multiple use objectives.

GENERAL RULES AND REGULATIONS

- ❖ A team will be composed of three or four 4-H members. Team scores will be based on the three highest scoring team members. 4-H members not part of a team may compete individually.
- ❖ Nine-to thirteen year-old 4-H members will compete in the Junior Division. Senior Division contestants must be 14 years of age by January 1 of the year in which they are competing.**
- ❖ The following materials will be necessary for each participating member:
 - => clipboard or writing board
 - => pencil
 - => paper
 - => compass
 - => tree scale stick (Biltmore stick or a Tree & log scale stick w/ Merritt hypsometer)
- ❖ No smoking or use of tobacco products will be allowed during the contest.
- ❖ Field clothing (e.g., long pants & long-sleeved shirt) is suggested including heavy shoes/boots.
- ❖ The contest will consist of the following five events:
 - Tree Identification
 - Insect/Disease Identification
 - Compass & Pacing
 - Forest Evaluation
 - Written Forestry Quiz
- ❖ The official study guides and the source of all questions for the Forestry Quiz will be the member's manual **4-H Forestry Program: Unit A – Trees; Unit B – Forests; Forest Trees of Oklahoma** and this handbook. (See Forestry Quiz section in handbook.)



** **ONLY** Senior Division Teams are eligible for National Competition.

NOTE: *The number of teams which can qualify for State Competition will be determined annually.*

TREE IDENTIFICATION

Learning to identify trees is the first step in successfully appreciating, understanding, and managing forestland. A knowledge of the major uses of different tree species aids in the wise use of this renewable natural resource.

Contest Rules

- ❖ Contestants will be required to identify 10 species from the 56 listed below.
- ❖ Each contestant will be judged on the accuracy of identification, spelling of common names, and listing of major uses. Scientific names will **NOT** be required; however, incomplete names will be counted as **wrong**. For Example: maple instead of *red maple* or pine instead of *shortleaf pine*.
- ❖ Contestants will be given three minutes to identify each tree specimen and record the information on the score card.
- ❖ Seven (7) points will be given for the correct common name. Three (3) points will be given for the correct use. Two (2) points will be deducted for each misspelled name. **Spelling, including capitalization, must be the same as that on the Official List of Tree Species in order to be counted as correct.** Only proper names need to be capitalized (e.g., American elm). The common name on the answer card must be the one given in the species list shown below.

Study Guide

The recommended study guide for the Tree Identification event will be the 2002 revision of:
Forest Trees of Oklahoma by Elbert L. Little, Jr. It can be obtained through:

Oklahoma Forestry Services Division, 122 State Capitol Bldg. OKC, OK 73105 (405) 521-3864.
 The cost is \$4.00 (\$3.00 plus \$1.00 shipping & handling)

A second resource with nearly 1000 color photographs is the *Audubon Society Field Guide to North American Trees - Eastern Region*. This book is more expensive, with a cost of approximately \$20.00 at most retail bookstores; however, it may also be available at many local libraries.

Also try the Virginia Tech Dendrology web site: <http://www.cnr.vt.edu/DENDRO/DENDROLOGY/factsheets.cfm>

Contestant Name: _____ Contestant No: _____
 County/4-H Chapter: _____

TREE IDENTIFICATION (Scorecard)

Tree #	Common Name (Minus 2 Points for Misspelling)	Major Use in OK (3 pts., # only)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

MAJOR USE IN OK

1. Lumber and/or Pulpwood
2. Furniture & Fixtures
3. Fenceposts and/or Erosion Control
4. Ornamental
5. Fuelwood
6. Wildlife Food

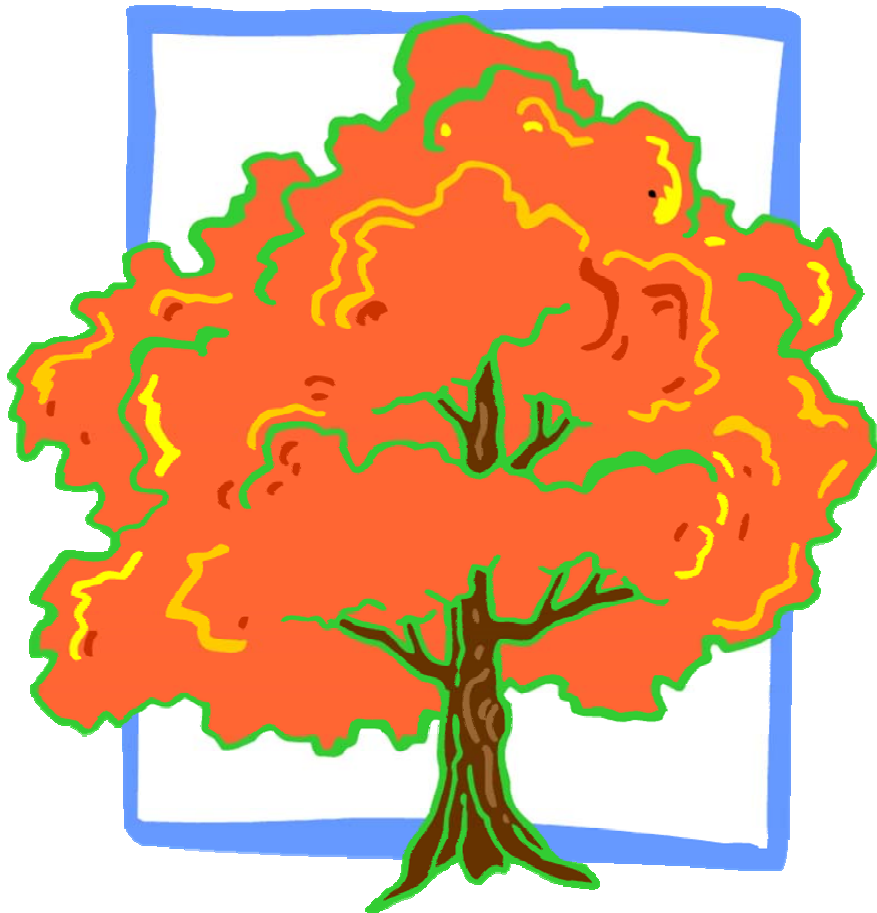
Contestant's Score: _____

TREE SPECIES LIST

	Common Name	Botanical/Scientific Name	Major Use in Oklahoma
1	American basswood	<i>Tilia americana</i>	lumber and/or pulpwood
2	American beech	<i>Fagus grandifolia</i>	furniture & fixtures
3	American elm	<i>Ulmus americana</i>	lumber and/or pulpwood
4	American holly	<i>Ilex opaca</i>	ornamental
5	baldcypress	<i>Taxodium distichum</i>	lumber and/or pulpwood
6	bitternut hickory	<i>Carva cordiformis</i>	furniture & fixtures
7	black cherry	<i>Prunus serotina</i>	furniture & fixtures
8	black locust	<i>Robinia pseudoacacia</i>	fenceposts and/or erosion control
9	black oak	<i>Quercus velutina</i>	lumber and/or pulpwood
10	black walnut	<i>Juglans nigra</i>	furniture & fixtures
11	black willow	<i>Salix nigra</i>	erosion control
12	blackgum	<i>Nyssa sylvatica</i>	furniture & fixtures
13	blackjack oak	<i>Quercus marilandica</i>	fuelwood
14	boxelder	<i>Acer negundo</i>	ornamental
15	bur oak	<i>Quercus macrocarpa</i>	lumber and/or pulpwood
16	buttonbush	<i>Cephalanthus occidentalis</i>	erosion control
17	chinkapin oak	<i>Quercus muehlenbergii</i>	lumber and/or pulpwood
18	chittamwood	<i>Bumelia lanuginosa</i>	wildlife food
19	common persimmon	<i>Diospyros virginiana</i>	wildlife food
20	downy serviceberry	<i>Amelanchier arborea</i>	wildlife food
21	eastern cottonwood	<i>Populus deltoides</i>	lumber and/or pulpwood
22	eastern redbud	<i>Cercis canadensis</i>	ornamental
23	eastern redcedar	<i>Juniperus virginiana</i>	fenceposts and/or erosion control
24	flowering dogwood	<i>Cornus florida</i>	ornamental
25	green ash	<i>Fraxinus pennsylvanica</i>	furniture & fixtures
26	hackberry/sugarberrv	<i>Celtis occidentalis</i>	furniture & fixtures
27	hazel alder	<i>Alnus serrulata</i>	wildlife food and/or erosion control
28	honeylocust	<i>Gleditsia triacanthos</i>	fenceposts and/or erosion control
29	Kentucky coffeetree	<i>Gymnocladus dioicus</i>	furniture & fixtures
30	loblolly pine	<i>Pinus taeda</i>	lumber and/or pulpwood
31	mockernut hickory	<i>Carva tomentosa</i>	furniture & fixtures
32	northern red oak	<i>Quercus rubra</i>	lumber and/or pulpwood
33	Osage-orange	<i>Maclura pomifera</i>	fenceposts and/or erosion control
34	pecan	<i>Carya illinoensis</i>	furniture & fixtures
35	pignut hickory	<i>Carva glabra</i>	furniture & fixtures
36	pin oak	<i>Quercus palustris</i>	ornamental
37	post oak	<i>Quercus stellata</i>	lumber and/or pulpwood
38	red maple	<i>Acer rubrum</i>	furniture & fixtures
39	red mulberry	<i>Morus rubra</i>	wildlife food
40	river birch	<i>Betula nigra</i>	ornamental
41	sassafras	<i>Sassafras albidum</i>	wildlife food
42	shagbark hickory	<i>Carva ovata</i>	fuelwood
43	shortleaf pine	<i>Pinus echinata</i>	lumber and/or pulpwood
44	Shumard oak	<i>Quercus shumardii</i>	lumber and/or pulpwood
45	silver maple	<i>Acer saccharinum</i>	furniture & fixtures
46	southern red oak	<i>Quercus falcata</i>	lumber and/or pulpwood
47	sugar maple	<i>Acer saccharum</i>	furniture & fixtures
48	sweetgum	<i>Liquidambar styraciflua</i>	furniture & fixtures
49	sycamore	<i>Platanus occidentalis</i>	lumber and/or pulpwood
50	Texas (or Ohio) buckeye	<i>Aesculus glabra</i>	ornamental
51	tree sparkleberry	<i>Vaccinium arboreum</i>	wildlife food
52	water oak	<i>Quercus nigra</i>	lumber and/or pulpwood
53	white ash	<i>Fraxinus americana</i>	furniture & fixtures
54	white oak	<i>Quercus alba</i>	lumber and/or pulpwood
55	willow oak	<i>Quercus phellos</i>	lumber and/or pulpwood
56	winged elm	<i>Ulmus alata</i>	lumber and/or pulpwood

Explanation of Tree Species Major Use Categories

- Lumber:** includes material used in general construction, flooring, boxes and crates, pallets, and railroad crossties (to name a few)
- Pulpwood:** wood cut primarily to be converted into wood pulp for the manufacture of paper, fiberboard, or other wood fiber products
- Furniture & Fixtures:** includes all types of furniture plus cabinetwork, millwork, and interior trim
- Ornamental:** trees used for shade, beautification, or landscaping
- Fenceposts:** self-explanatory
- Erosion Control:** trees beneficial in preventing water and wind erosion
- Fuelwood:** self-explanatory
- Wildlife Food:** tree fruits and nuts such as berries and acorns



INSECT AND DISEASE IDENTIFICATION

Foresters are often asked to recognize and identify forest insects and diseases or evidence of damage caused by the various insect agents or pathogens. This is a valuable skill because most insects or diseases that damage trees affect only certain tree species or groups of related species. Specimens will be selected and displayed which are representative of disease or insect damage.

Contest Rules

- The official study guide(s) for the Insect/Disease Identification event include(s):
 - Oak Pests: A Guide to Major Insects, Diseases, Air Pollution & Chemical Injury, Protection Report R8-PR7, USDA Southern Forest Exp. Sta., 1720 Peachtree St. NW, Atlanta, GA 30367-9102; Sept. 1987. (404) 347-2961
 - Insects and Diseases of Trees in the South, Protection Report R8-PR 16, USDA Southern Forest Experiment Station, 1720 Peachtree St. NW, Atlanta, GA 30367-9102; June 1989. (404) 347-2961
- Contestants will be required to identify 10 insects and/or diseases or specimens of damage caused by either agent. Specimens will be selected from those on the "**Official List of Insects and Diseases.**"
- Contestants will be judged on the accuracy of identification and the spelling of the common names. Scientific names will not be required. However, incomplete names will be considered incorrect.
- **Spelling, including capitalization, must be the same as that on the "Official List of Insects and Diseases" in order to be counted as correct.**
- Contestants will be given a time limit to identify the insect/disease or damage specimens.
- Five points will be given for each correct common name. One point will be deducted for each name misspelled.
- The common name must be the one used in the "**OFFICIAL LIST OF INSECTS AND DISEASES.**" The total score for this event is 50 points.

Contestant Name: _____ Contestant No: _____
 County/4-H Chapter: _____

Insect & Disease Identification Scorecard

Species #	Common Name	Correct +5 Misspelled -1	Score
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Contestant's Score: _____

OFFICIAL LIST OF INSECTS AND DISEASES

* Insects/diseases were added/removed based on the National Handbook Official List in 2006

Insects

Common Name

Asian longhorned beetle
balsam woolly adelgid
beech scale
bronze birch borer
caterpillar hunter beetle
checkered beetle
Douglas-fir tussock moth
eastern tent caterpillar
emerald ash borer
European pine sawfly
fall webworm
forest tent caterpillar
gypsy moth
hemlock woolly adelgid
Ips engraver beetles
Japanese beetle
locust borer
locust leafminer
mountain pine beetle
Nantucket pine tip moth
pales weevil
periodical cicada
pine needle scale
red oak borer
redheaded pine sawfly
smaller European elm bark beetle
southern pine beetle
twolined chestnut borer
white pine weevil
whitemarked tussock moth

Scientific Name

Anoplophora glabripennis
Adelges piceae
Cryptococcus fagisuga
Agrilus anxius
Calosoma sycophanta
Thanasimus dubius
Orgyia pseudotsugata
Malacosoma americanum
Agrilus planipennis
Neodiprion sertifer
Hyphantria cunea
Malacosoma disstria
Lymantria dispar
Adelges tsugae
Ips spp.
Popillia japonica
Megacyllene robiniae
Odontota dorsalis
Dendroctonus ponderosae
Rhyacionia frustrana
Hylobius pales
Magicicada septendecim
Chionaspis pinifoliae
Enaphalodes rufulus
Neodiprion lecontei
Scolytus multistriatus
Dendroctonus frontalis
Agrilus bilineatus
Pissodes strobi
Orgyia leucostigma

Diseases

Common Name

artist conk
annosus root rot
beech bark disease
black knot
brown spot needle blight
cedar-apple rust
chestnut blight
dogwood anthracnose
Dutch elm disease
dwarf mistletoe
fusiform rust
Hypoxylon canker
lichens
Nectria canker
needle casts
oak wilt
red heart
white pine blister rust
white trunk rot of birch

Scientific Name

Fomes applanatus
Heterobasidion annosum
Nectria coccinea var. *faginata*
Apiosporina morbosa
Scirrhia acicola
Gymnosporangium juniperi-virginianae
Endothia parasitica
Discula sp.
Ceratocystis ulmi
Arceuthobium pusillum
Cronartium quercuum f.sp. *fusiforme*
Hypoxylon sp.
numerous species
Nectria galligena and *N. magnoliae*
Hypoderma sp. and *Lophodermium* sp.
Ceratocystis fagacearum
Fomes pini
Cronartium ribicola
Inonotus obliquus

COMPASS TRAVERSE / FOREST ORIENTEERING

Foresters are often asked to locate property boundaries, and to "cruise" timber and other forest resources. To accomplish this, foresters estimate ground distances by the pacing method and determine direction of travel using a compass. This exercise is designed to emphasize these two skills by measuring and judging direction of a course of three lines. The lines may be level, uphill, or downhill, and successive lines may or may not be continuous.

Equipment and Preliminary Procedures

- ◆ Contestants should determine the number of paces he/she takes per 100 feet on a practice course prior to the contest. (If desired, a distance corresponding to a Gunter's chain--66 feet--may also be used.)
- ◆ For the competition, each contestant should have:
 1. A compass** from which precise bearings may be determined (e.g. Silva Ranger mirror-sighting type azimuth or quadrant compass). Contestants may use his/her own hand-held compass, provided it is neither more accurate nor more sophisticated than the Silva Ranger. No compass declinations will be necessary.
 2. A pencil
 3. An official scorecard

⊗ No calculators may be used during this phase of the contest

** A limited number of compasses are available for use during the contest from Natural Resource Ecology and Management Extension. For those wishing to purchase their own compasses, they may be ordered from **Ben Meadows Co. 1-800-241-6401** or **Forestry Suppliers, Inc. 1-800-647-5368**.

Contest Rules

- A contest official will be assigned to the course
- Instructions will be given to contestants prior to beginning the course. This exercise will be completed on an individual basis. Each contestant will measure the azimuth or bearing and the distance for each line, record the measurements on a score sheet, and return the score sheet to the official in charge when completed.
- The course layout will consist of three lines with marked corners. Contestants will pace (in feet) the three respective lines using the compass (bearings or azimuths in degrees) for obtaining the line of direction. Every effort will be made to avoid slopes greater than 15%, steep ravines, heavy brush, large rocks, and wetlands on the contest course.
- Contestants using a quadrant compass are required to use the correct two-letter designation with each bearing recorded on the score sheet. For example: N 27° W.

Scoring

- Contestants can receive a possible score of 48 points for distance pacing and 48 points for the compass exercise. Each contestant will receive an automatic 4 points to make the maximum total score 100 points.
- Answers within two (2) degrees of the correct bearing or two (2) feet of the correct distance will be given full credit. One point will be deducted for each degree of error in the compass bearings in excess of an error of plus or minus two degrees. One point will also be deducted for each foot of error in the distance measurement in excess of an error of plus or minus two feet. **Maximize points lost for any one distance or bearing measurement will be 16 points.**
- The sum of the pacing and compass errors will be subtracted from the maximum score.

Scoring Example

Line 1 (judges master scorecard answer)

Distance (feet) 58ft. Error (acceptable range = 56 to 60 ft.)

Bearing (degrees) 36° Error (acceptable range = 34 to 38°)

Line 2 (contestant's answer)

Distance (feet) 55ft. Error -1 point

Bearing (degrees) 38° Error - 0 point

Contestant Name: _____ Contestant No: _____

County/4-H Chapter: _____

COMPASS TRAVERSE (Scorecard)

Course (Color) _____

Line 1

Distance (feet) _____ Error _____ (deduct 1 pt./ft. in excess of 2 ft. error)

Bearing (degrees) _____ Error _____ (deduct 1 pt./ft. in excess of 2° error)

Line 2

Distance (feet) _____ Error _____ (deduct 1 pt./ft. in excess of 2 ft. error)

Bearing (degrees) _____ Error _____ (deduct 1 pt./ft. in excess of 2° error)

Line 3

Distance (feet) _____ Error _____ (deduct 1 pt./ft. in excess of 2 ft. error)

Bearing (degrees) _____ Error _____ (deduct 1 pt./ft. in excess of 2° error)

Distance Score _____ (48 pts. possible) Bearing Score _____ (48 pts. possible)

CONTESTANT'S SCORE _____

DEVELOPING COMPASS AND PACING TECHNIQUES

Compass

A compass is designed to help the user determine his/her direction of travel by estimating the angle deflection from magnetic north. Magnetic north is the direction the compass needle points.

There are many different types of compasses, but nearly all will have some features in common, including:

(see Figs. 1 & 2 below).

1. Direction of travel indicator or arrow;
2. North sign;
3. Magnetic needle;
4. A 360° dial, marked by azimuths or quadrants. Azimuths range from 0° to 360° (Fig.1). Bearings range from 0° to 90° in each of four quadrants (Fig. 2).

For this contest, be certain the compass used reads in increments of at least two degrees (2°).

Fig. 1

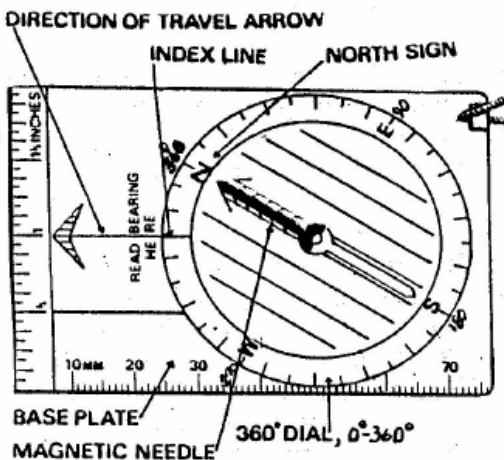
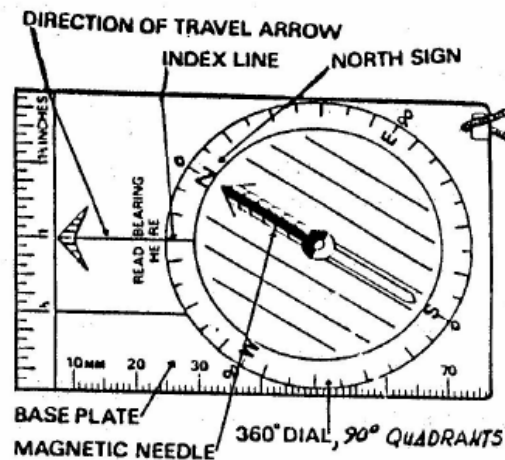


Fig. 2



Compass direction (or bearing) may be determined by facing the target in the intended direction of travel, holding the compass level (at eyelevel), and turning the dial until the north sign lines up with the north or **red** end of the needle (i.e., *putting Snoopy in the doghouse*). Next, read the bearing where the direction of travel indicator intersects the dial. This will be the magnetic bearing, or the angle measured between the objective and magnetic north. Depending on the particular compass used, bearings may be recorded by azimuth (from 0° to 360°) or by quadrant (N 45° W, S 30° E, etc.).

Remember, the key to becoming proficient with a compass is the same as for all other phases of the Forestry Judging contest: **PRACTICE!!!**

*References:

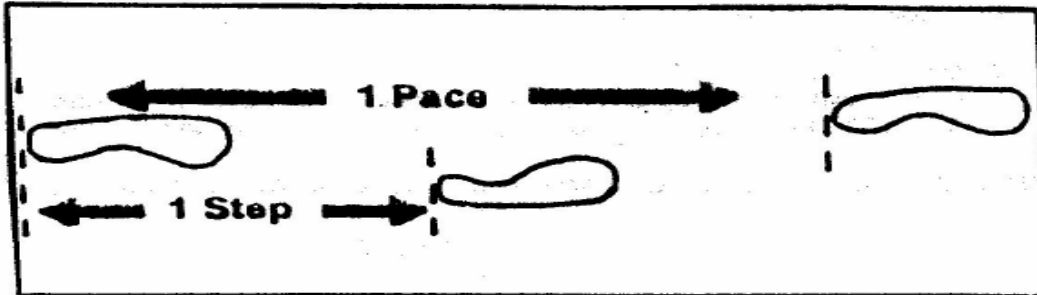
1. Andresen, Steve: **The Orienteering Book**, 1977, World Publications, Box 366, Mountain View, CA 94042.
2. Bengtsson, Hans and George Atkinson: **Orienteering for Sport and Pleasure**, 1977, The Stephen Greene Press, Brattleboro, VT.
3. Kjellstrom, Bjorn: **Be Expert with Map & Compass**, 1976, Charles Scribner & Sons, New York, NY.

** The above references may be available at sporting goods stores which sell orienteering equipment and supplies. Other references may also be available.

Pacing

All maps and land surveys express the distance between two points as the horizontal distance, which is the distance measured on the level. Pacing is an easy, but crude, method of determining ground distances. A **pace is two steps** (Fig. 3). On level, open ground, pacing can become fairly accurate, with practice. An individual's pace is generally consistent [for that individual] when walking at a natural gait. But, on slopes or in brushy or rocky areas, its accuracy diminishes; therefore, a participant should practice on different terrain to establish an accurate pace for situations encountered in the field.

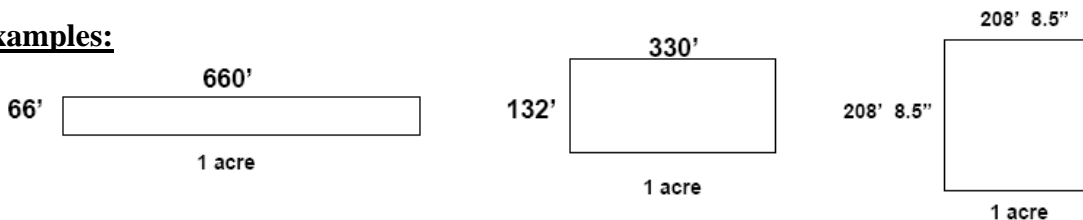
Figure 3: Illustration showing the difference between a step and a pace.



To determine the feet covered in one pace, a practice course is very helpful. Mark a starting point and measure 100 feet. Set another marker at this spot. At a normal rate, walk from one point to the other, counting the number of paces. Then, divide the total number of paces into 100 ft., and this gives the number of feet per pace. It is recommended to repeat this process several times to get a more accurate average feet per pace measurement.

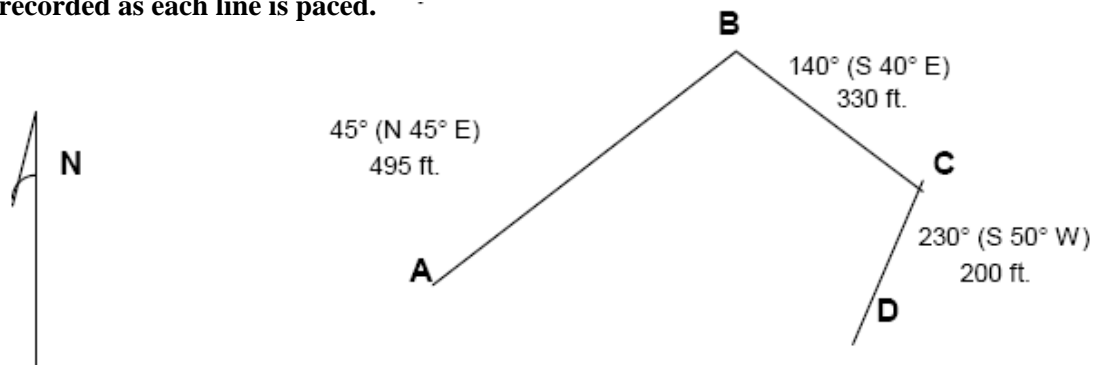
A course of 66 ft. (one Gunter's Chain) may also be used. Simply divide the total number of paces into 66 feet to determine the number of feet per pace. The Gunter's chain is used by many foresters because of its ease in use to determine distances and areas. One mile contains 80 chains (5280 feet), and this breaks down handily for fractions of a mile (i.e., 40 chains = 1/2 mile or 2640 feet; 8 chains = 1/10 mile or 528 feet). Another feature of this 66 foot Gunter's chain is that ten square chains equal one acre, or 43,560 square feet. Therefore, if an individual paces around a rectangle on the ground that is one chain (66 ft.) wide and ten chains (660 ft.) long, he/she will have walked around one acre of land.

Examples:



**** During the contest, make certain that the number of feet traveled on the compass bearing is recorded as each line is paced.**

Example:



FOREST EVALUATION

Every acre of land should be devoted to its best use. This is a concept that landowners have held for many years regarding their agricultural land. Level and slightly rolling land was used for row crops and grain, and rolling and better upland slopes for pasture and meadow. The general idea about forest land is that forests will grow well on all lands not suited for other crops. This is **incorrect**. There are excellent, good, fair, and poor sites for timber production just as there are different kinds of farm crop land. There are forest lands that will economically support intensive management and permanent physical improvements, and other stands in the same area might barely pay land taxes. There are acres that can be harvested every ten years, and there are other acres that may never produce commercial timber.

Forest Evaluation is based on the premise that trees will be harvested, now or in the future, to maximize the goals of a specified landowner. This event has been developed to provide contestants an opportunity to learn, firsthand, about the characteristics affecting the growth of the forest crop.

The Forest Evaluation event is divided into four parts:

- I. Site Evaluation (25 pts. possible)**
- II. Stand Evaluation (25 pts. possible)**
- III. Recommended Practices (25 pts. possible)**
- IV. Inventory (25 pts. possible)**

To master this event, it is important that the contestant carefully study the material that follows. Each component of the forest is closely linked with the other, and an understanding of the relationships that exist is crucial to the participant's success.*

Silviculture

Volumes have been written about trees: how they grow; how stands are established; the growth requirements as well as factors affecting these requirements. The study of these factors and requirements is a branch of forestry known as **silviculture**.

Silviculture is the art of managing the establishment, growth, and reproduction of forest stands by manipulating light, water, nutrients and other available resources.

To be successful, a forest manager must know how to adjust or compensate these factors effectively and how to avoid making serious mistakes in developing a sound forest management program.

Site Evaluation (25 pts. possible)

The site is the environment in which a plant or a plant community lives. There are a number of site factors that determine the desirability of a location for a tree crop whether the trees will grow in a vigorous and healthy manner and reach maturity in a sound state. Some factors used to determine the forest land capability class of a particular tract of land include: soil depth, slope percent, aspect, and slope position.

Soil depth is the distance from the soil surface down to unweathered rock or an impermeable layer which restricts water movement and root penetration. For competition purposes, shallow soils are less than 24 inches deep, and deep soils are 24 inches or greater in depth.

**Many of the Land Judging Contest techniques are applicable for evaluation of a forest site.*

Slope percent is the number of feet of rise or fall in 100 feet of horizontal distance. For contest purposes, slope percent is broken into the following "steepness" categories:

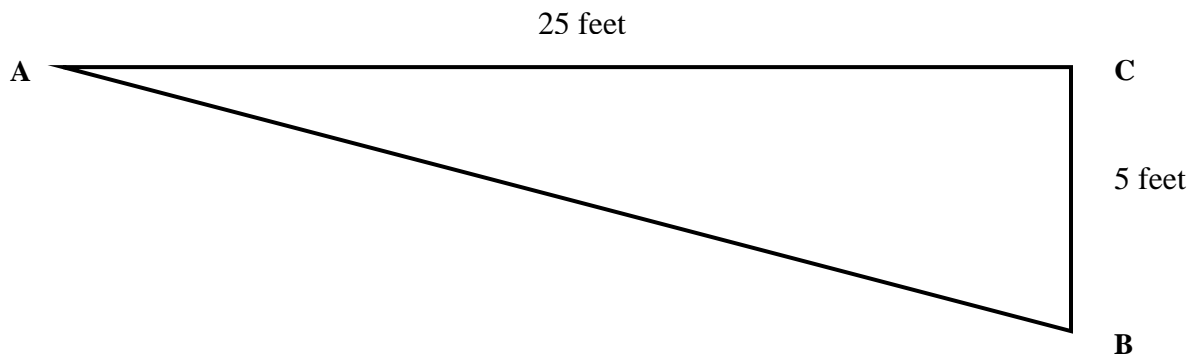
Rolling	0 to 20% slope
Steep	21 to 40% slope
Very Steep	40+ % slope

Slope percent can be measured with an Abney level or a clinometer. However, one way to **approximate** slope percent if a clinometer is not available is to measure a typical section of slope using a 100 foot tape and starting at an upslope position.

1. Measure downhill (from point A to point B) 25 feet.
2. Have a partner at the starting point (point A) hold the tape or string at his/her feet.
3. Standing at point B, draw the tape tight and hold it level to your partners feet
4. Measure the distance the tape is being held above the ground (point B to point C).
5. Divide that distance by 25 feet and multiply the quotient by 100 to obtain the slope (formula is shown below).

The figure below is an example of approximating slope percent.

Figure 4: Figuring Slope Percent



The simple **formula** to calculate the percent of slope is:

$$\mathbf{BC/AC \times 100 = \text{slope percent of AB}}$$

Sample problem: (from illustration)

$$(5 \text{ feet} / 25 \text{ feet}) * 100 = \text{Slope \%}$$
$$.20 * 100 = 20\% \text{ slope}$$

Aspect is determined by taking a compass reading while facing down a slope. The direction water would run gives the compass direction. Any slope facing north and east of a line extending from northwest (315°) to southeast (135°) is considered to have a desirable northeast aspect. Any slope facing south and west of the same line is considered to have a less desirable southwest aspect. See **Figure 5**.

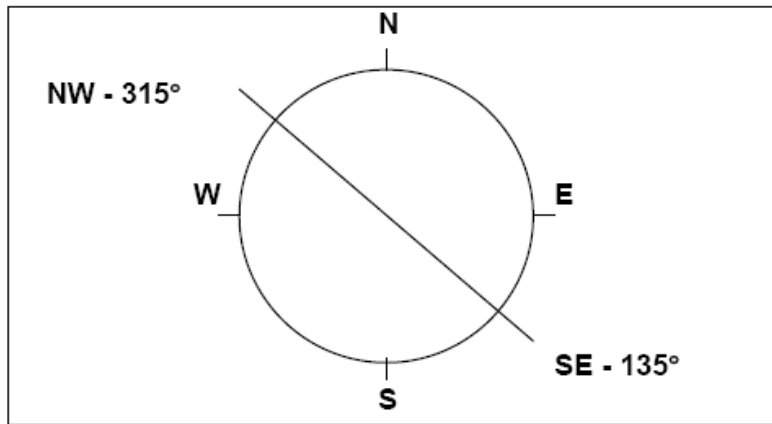


Figure 5

Slope position is determined only on hilly sites. The positions are classified as:

Upper 1/3

Middle 1/3

Lower 1/3

Ridge tops or level plateaus and bottomlands are classified separately in land capability classes.

Forest land is divided into four **Land Capability Classes**: excellent, good, fair, and poor. Much of the information obtained in evaluating the site requirements (aspect, slope position, slope percent) helps in determining the classification.

Class I: Excellent This land has few limitations for tree growth. Most sites have little slope and no erosion problems. The soil is fertile and holds water well. It is well drained, but not droughty. These sites will produce a good stand of timber.

Class II: Good This land is usually gently sloping. In some cases there are drainage problems that may affect tree growth.

Class III: Fair This land may be fairly steep (having a greater slope %). Soils may be shallow, have low fertility and tend to be droughty.

Class IV: Poor This land may be very steep with shallow soil. It may also be rocky or shaly and have low fertility. Additionally, it can either be extremely wet or extremely dry. Good examples are ridge tops and swamps.

Forest Stand Evaluation (25 pts. possible)

The forest stand is a community of trees living together in competition with each other and other herbaceous vegetation. The stand may include a great variety of species and may have more than one forest type.

Grazing/browsing damage is defined by the following categories for the purpose of this contest:

Severe: tree seedlings are eaten or trampled, soil is compacted and bark is rubbed off the larger trees.

Slight: animals only slightly affected forest conditions (apparently had enough grass or meadow available for bulk of grazing or browsing).

Ungrazed: no appreciable evidence of grazing.

Fire may have been present either as a destructive agent or a management tool.

Wildfire can be very destructive, particularly when fuel buildups are heavy. Destruction of the litter layer on the forest floor, crown scorch or burning of the foliage, and scalds or scars on the tree trunks are all evidence of wildfire damage. Additionally, seeds awaiting germination are destroyed when the duff (litter) layer is burned.

A **prescribed fire** (controlled burn) is a forest management tool that can be used to manage competing vegetation, increase biodiversity and stand structure, prevent fuel accumulation, and improve wildlife habitat without damaging the crop trees.

Size Distribution of a stand considers the sizes of all stems present on the site. In all aged stands, there may be three or more size classes represented. In many even aged stands there will be only one size class. In a good stand, a ratio of sizes of reproduction, saplings, poles, and sawtimber should be fairly evenly distributed. This is necessary in a sustained yield program. Specific stem sizes include:

Reproduction (seedling): 0 to 2 inches diameter

Sapling: 2 to 6 inches diameter

Pole timber: 6 to 12 inches diameter

Sawtimber: 12+ inches diameter

Forest types have been defined by the Society of American Foresters since 1932, and are used under Society recommendations. The recognition of forest types is necessary because different forest types require different types of management. Examples of forest types include: cove hardwoods; northern hardwoods (beech, birch, and maple); white pine - hardwoods; hard pine - hardwoods; white pine; mixed oak; red oak - white oak - hickory.

The Oklahoma forests may include the following classifications and the following forest types will be used in the Oklahoma 4-H Forestry Judging Competitions.

Bottomland Hardwoods

Oak - Hickory

Yellow Pine - Hardwood

Cove Hardwoods

Post Oak - Blackjack Oak (Crossttimbers)

Yellow Pine (Hard Pine)

Stand origin can vary from one stand to another, even though the stands are of the same forest type and size distribution. Timber stands may originate by several different means:

Seed

Sprouts (coppice)

Planted Seedlings (plantations)

Among the pines in Oklahoma, only shortleaf pine will sprout as an adaptation to fire. Many of Oklahoma's hardwoods will also sprout, and good quality trees can be produced from sprouts if stumps are cut close to ground level and the less vigorous sprouts are removed. Seeds are often parasitized by animals, insects, or fungi and bacteria. Seed crops of many Oklahoma species are erratic, being adequate only occasionally. Planted seedlings give control over spacing, species competition, and genetic traits.

Stocking and stand density are two terms that are used interchangeably. Stocking is a term used to describe how well the trees in a stand utilize the available space. In classifying a stand, the following terms will be used.

Well-stocked: A stand in which the trees are well distributed, and all the space is utilized, but the trees still have room for continued growth.

Understocked: A stand in which there are large open spaces between the trees. This stand will not produce its full potential.

Overstocked: A stand that is so overcrowded that trees grow very slowly, or have poor form due to heavy competition.

Crown Class refers to the tree's position within the total canopy of the forest stand.

Dominant: trees have crowns that extend above the average of the surrounding tree crowns. They receive light from directly above and some from the sides.

Co-Dominant: trees have crowns that form the general level of the canopy. They receive sunlight from the top, but very little from the sides.

Intermediate: trees are shorter than the preceding crown classes, but have some branches that extend into the general crown cover. They receive little light from above and none from the sides.

Suppressed: trees have their crown entirely below the general crown level and receive no direct sunlight from above or below.

Contestant Name: _____ Contestant Number: _____
 School: _____ County/4-H Club: _____

FOREST EVALUATION
Scorecard

Team Number: _____ Total Score: _____

I. Site Evaluation: Circle **(A)** Soil Depth **(B)** Slope Percent **(C)** Aspect, and **(D)** Slope Position as they apply to the area being surveyed

A. Depth of Soil	Deep – 24" or more						Shallow – less than 24"					
B. Slope Percent	Rolling 0-20%		Steep 21-40%		Very Steep 41%+		Rolling 0-20%		Steep 21-40%		Very Steep 41%+	
C. Aspect	NE	SW	NE	SW	NE	SW	NE	SW	NE	SW	NE	SW
D. Slope Position												
Bottom	I	II	I	II	I	II	I	II	I	III	II	III
Lower 1/3	I	II	I	II	I	III	I	III	II	III	III	IV
Middle 1/3	I	II	II	III	II	III	II	III	III	IV	IV	IV
Upper 1/3	II	III	III	III	IV	IV	III	IV	III	IV	IV	IV

E. Forest Land Capability Class: Determine the proper land capability class by drawing a line from the **Aspect** circled and across from the **Slope Position** circled. The Roman numeral where these lines intersect indicates the class. **Circle the class below.**

I. Excellent II. Good III. Fair IV. Poor

Sub-Score Part I _____
(25pts. Possible)

II. Forest Land Capability Class: (Check the correct answer in each section A-F)

A. Grazing/Browsing Damage

Severe _____
 Slight _____
 None _____

D. Forest Type

Bottomland _____
 Hardwoods _____
 Cove Hardwoods _____
 Oak-Hickory _____
 Post Oak-Blackjack _____
 (Crosstimbers) _____
 Yellow Pine – _____
 Hardwood _____
 Yellow Pine _____
 (Hard Pine) _____

E. Stand Origin

Seedling _____
 Sprout _____
 Mixed _____
 Plantation _____

B. Evidence of Fire

Unburned _____
 Wildfire _____
 Prescribed Burn _____

F. Stocking

Well Stocked _____
 Overstocked _____
 Understocked _____

C. Size Distribution: (There may be more than one answer)

Reproduction _____ Sapling _____ Pole _____ Sawtimber _____

Sub-Score Part II _____
(25pts. Possible)

Recommended Practices (25 pts. possible)

A list of recommended forest practices appears on the Forest Evaluation Scorecard. Multiple landuse principles should be evident as the forest management process begins. Participants will be given information about the landowner and his/her objectives for management. Based on the data collected about the site and timber stand, and on the landowner's management objectives, the contestant must consider the practices listed on the scorecard. The recommended practices should be those which will improve the stand and help accomplish the landowner's objectives. Answers may vary according to the practices needed to meet landowner objectives. The list of recommended forest practices follows.

Example of Forest Evaluation Scorecard (page 2):

Part III: Recommended Forest Practices

Mark those practices below that help the landowner achieve his/her management objectives.

- 1. Leave alone to grow. _____
- 2. Thin stand for pulpwood, fuelwood, or other products leaving the desirable trees to grow. _____
- 3. Fence area from livestock. _____
- 4. Inventory and mark timber in preparation for final harvest. _____
- 5. Selectively cut mature trees with farm labor for home use or sale. _____
- 6. Girdle wolf trees or kill them with chemicals to provide sunlight for natural reproduction that is expected or now present. Where use of wolf trees is possible, cut and use instead of killing and leaving. _____
- 7. Cut heavily, leaving sufficient seed trees to adequately restock the area. _____
- 8. Remove poorly formed and undesirable trees from the stand. _____
- 9. Remove diseased and insect damaged trees in a sanitation cutting. If a seed source is not available, replant the area with desirable species. _____
- 10. Remove vines causing damage to trees. _____
- 11. Plant open areas with recommended trees. _____
- 12. Conduct a thinning, when new stands are 5 to 10 years old, to release preferred species in the seedling stage. _____
- 13. Plant grasses and legumes on abandoned log roads and landings. _____
- 14. Leave snags, cavity trees, and downed woody material to provide valuable habitat for wildlife when clearcutting _____
- 15. A prescribed burn is recommended _____
- 16. Protect the area from wildfire. Report any fire to the state forestry agency. _____
- 17. Apply Best Management Practices (BMP's) such as culverts, water bars, outslowing of roads, erosion control plantings, streamside management zones (SMZ's), etc. _____

SubScore Part III _____
(25 pts. possible)

Forest Inventory (Forest Evaluation Scorecard, Page 2, 25 pts. possible)

A wise timberland owner or manager keeps an accurate inventory of his/her timber resources. He/she knows approximately how many board feet (volume) of lumber can be cut from trees of various sizes and from the stand as a whole. Better management decisions can be made when there is good information available on the volume per acre, total volume, and volume of the various products which might be harvested.

During this section of the Forest Evaluation event, **five** trees will be marked for identification and measurement.

The **species** of each numbered tree should be listed using the common names from the Official Tree List on Handbook page 4.

The **DBH** (diameter at breast height) should be measured (at 4 1/2 ft. above ground level) and recorded in **2 inch** diameter classes.

The **number of 16' logs** or height should be measured to the nearest half-log and recorded.

The **volume** in board feet of each tree should be determined, from the DBH and number of logs information, and using the Doyle Log Rule (form class 78) table provided. (example on page # 21).

Finally, the **Crown Class** of each tree should be determined and recorded as dominant, co-dominant, intermediate, or suppressed. Crown class definitions were discussed on Handbook page 15.

The following **tree measurement** information should be studied carefully by the contestant. It is included here to aid in preparation for the tree measurements and volume determination segments of the competition.

Tree Measurement

Each contestant will learn to measure standing trees to estimate the volume of forest products that may be obtained from the trees. He/she will identify five trees and estimate their diameters, merchantable heights, and volumes. Since most timber is bought and sold on a volume basis (usually by board foot volume), it is a good idea to have some estimate of total tree volume, volume per acre and volume by product before selling timber.

Products

Any type of forest product can be measured accurately, but the same unit of measure does not apply equally well to all products. For example:

Product Unit of Measure

Sawlogs Board feet

Pulpwood Cord

Firewood Cord or "rick"

Fence posts, poles, piling Piece

For this competition, only board foot measurements will be used.

Tools

There are a number of different tools which can be used to make tree measurements including a caliper, diameter tape, hypsometer, or clinometer. Some are more accurate, thus more expensive, than others.

For this contest a very inexpensive tool will be used to estimate both height and DBH measurements.

This instrument is called a **tree scale stick** and should be calibrated with the **Doyle Rule**.

Tree scale sticks may be purchased from the following companies:

Forestry Suppliers, Inc., P.O. Box 8397, Jackson, MS 39204 (18006475368)

Ben Meadows Co., P.O. Box 80549, Atlanta, GA 30366 (18002416401)

TSI Co., P.O. Box 206, Flander, NJ 07936

Methods

Diameter

The trunk of a tree is shaped somewhat like a cylinder so it is possible to estimate the volume by measuring both the diameter and the height. The **diameter** is **always** measured at 4.5 feet above the ground on the uphill side of the tree. This measurement is universally referred to as DBH or ‘diameter at breast-height.’

In order to measure the diameter of a tree, use the side of the scale stick (*a.k.a.*: Biltmore Stick) which reads “Diameter of Tree (in inches).” The tree scale stick must be held level, against the tree, at a distance of 25 inches from the eye and at a height of 4.5 feet above the ground (see **Figure 6** below). The stick is held perpendicular to the tree.

With the stick held level and flat against the tree, the following steps should be followed.

- ✧ Close one eye while looking straight ahead at the center of the tree
- ✧ Without moving your head, look to the left, and move the stick so that the “zero” end of the stick and outside bark of the tree line up
- ✧ Without moving your head, look to the right, and read the number which lines up with the right side of the tree trunk. This is the diameter.
- ✧ **Record diameter to the nearest two-inch diameter class.** For example, trees measuring 7.1 to 9.0 inches DBH are recorded as 8 inches DBH. A 4.3 inch tree is recorded as 4 inches, and a 10.7 inch tree is recorded as 10 inches DBH.

2” class = 1.1 to 3.0”

4” class = 3.1 to 5.0”

6” class = 5.1 to 7.0”

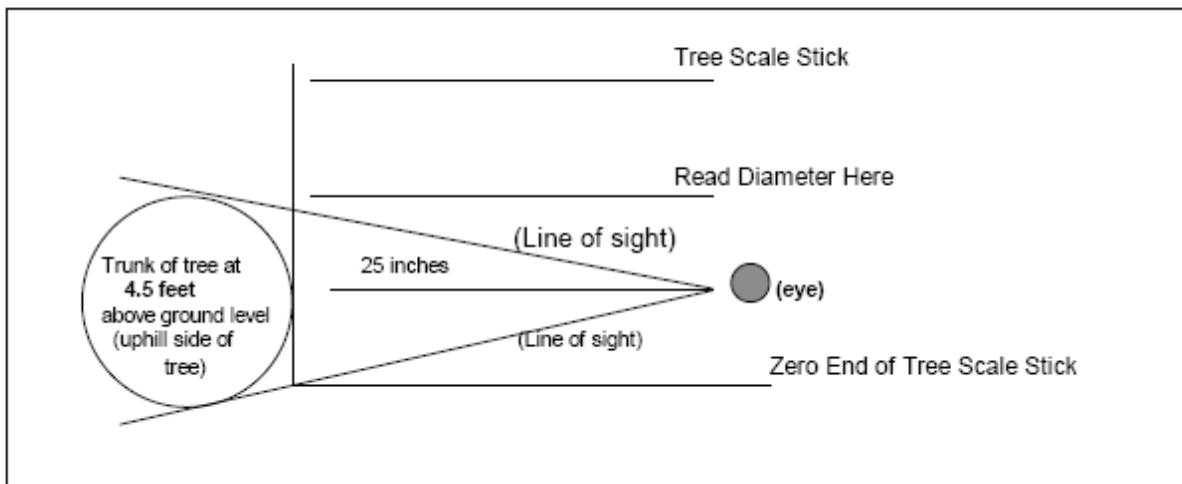
8” class = 7.1 to 9.0”

10” class = 9.1 to 11.0”

12” class = 11.1 to 13.0”

Any deviations in the above distances will result in inaccurate readings. Only considerable practice will prepare the contestant to obtain accurate measurements.

Figure 6 : Measuring Diameter



Height

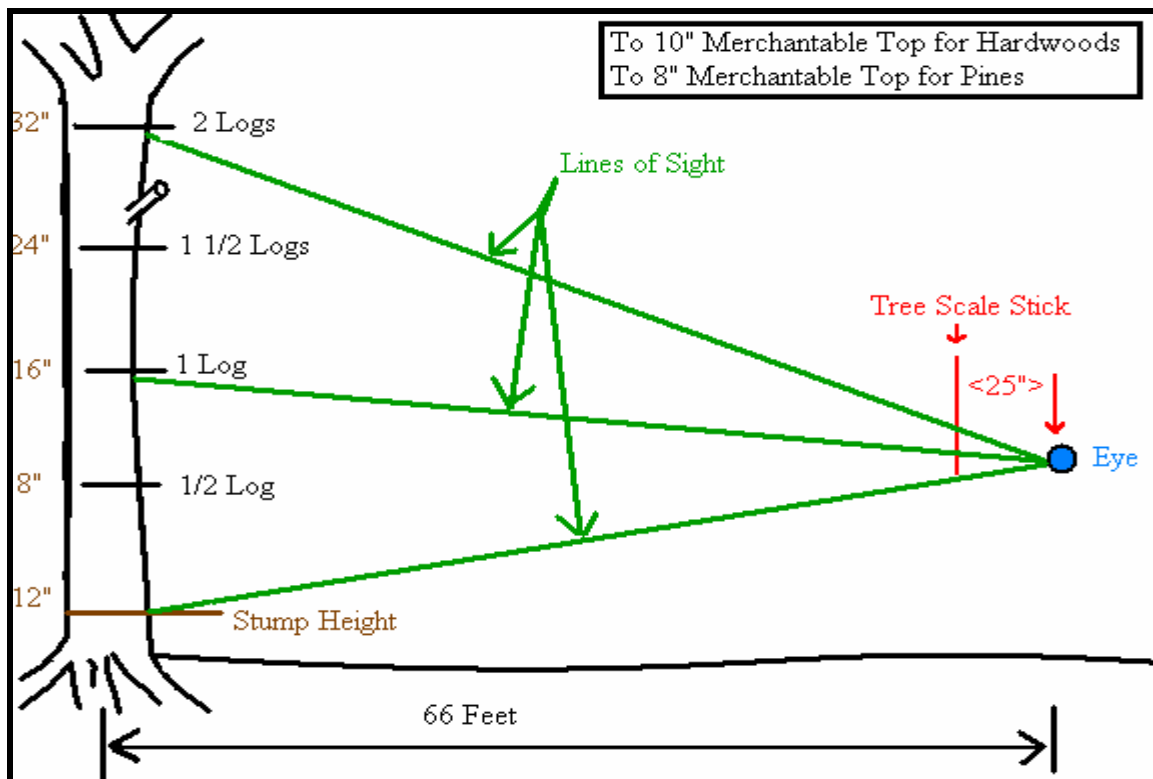
Height may be measured as either **total height** (from ground line to tree top) or as **merchantable height** (the length of the trunk that can produce the commercial product for which the tree may be harvested). **Merchantable height** will be the measurement used in this contest. Therefore, the top diameter (upper limit of height measurement) will be 8" for pine (softwood) trees and 10" for hardwood trees (deciduous).

To measure the merchantable height of a tree, the contestant should pace 66 feet out 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. Being uphill or downhill from the tree could give unreliable readings. Next, the participant should hold the tree scale stick so that the edge reading **NUMBER OF 16 FOOT LOGS** is facing him/her. This instrument on the edge of the tree scale stick is called a Merritt Hypsometer. Hold the stick in a vertical position with the **zero end** pointing toward the ground and look straight forward at the tree. Adjust the stick upward or downward so that the line of sight bisects the bottom of the stick at a point 12 inches above the ground or **stump height**. The contestant must remember: **DO NOT MOVE YOUR HEAD OR STICK, MOVE THE EYES ONLY!!** The individual should then look up the stick to a point where the top of the last merchantable cut would be made in the tree. This would be the point at which the diameter of the trunk tapers to 8 inches for pine and 10 inches for hardwoods, or where the first major fork or other major defect in the tree occurs. The measurement should be read to the **nearest 1/2 log**. If the merchantable height is slightly more than 2 1/2 logs, record it as 2 1/2 logs. But, if the merchantable height is slightly less than 2 1/2 logs, the reading must be recorded as 2 logs.

The most critical factors in this event include:

1. Distance from tree must be 66 feet
2. Distance from stick to eye must be 25 inches
3. Merchantable upper diameter limits
 - a. 8 inches upper limit for pine
 - b. 10 inches upper limit for hardwoods

Figure 7: Measuring Tree Heights



Volumes

A volume table is a table which estimates, on the average, the volume of wood contained in trees of various sizes. This volume is determined by applying the measured DBH (diameter at breast height) and the merchantable height to the table. A sample volume table is shown below.

For example, to find the average volume of a tree that had been measured to be 16" DBH with a merchantable height of 1 ½ logs, simply follow the column headed "**DBH in Inches**" to 16. Next, under the columns marked "**Volume (in board feet) by Number of Merchantable 16 foot Logs**", find the column marked **1 ½ logs**.

The point where 16 inches in diameter and 1 ½ logs bisect is the reading to be recorded in the **Volume (bd. feet)** area on the scorecard. In this instance, the correct volume would be **94 board feet**.

Example Scorecard: (Forest Evaluation, Page 2)

Part IV: Forest Inventory

Tree #	Tree Species	DBH	# of 16 Foot Logs	Volume in Board Feet	Tree Crown Class

Volume Table

Doyle Log Rule (Form Class 78)
Volume (in board feet) by Number of Merchantable 16-foot Logs

DBH (in)	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5
10	14	17	20	21	22				
12	29	36	43	48	53	54	56		
14	48	62	75	84	93	98	103		
16	72	94	116	132	149	160	170		
18	100	132	164	190	215	232	248		
20	135	180	225	261	297	322	346	364	383
22	174	234	295	344	392	427	462	492	521
24	216	293	370	433	496	539	582	625	668
26	266	362	459	539	619	678	737	793	849
28	317	434	551	650	750	820	890	961	1032
30	376	517	658	778	898	984	1069	1160	1251

Forestry Quiz

The primary objective of the 4-H Forestry Quiz is to provide an opportunity for youth to demonstrate their knowledge of forestry and related subject matter.

Contest Rules

- ✿ The examination will be an individual event with the score contributing to each individual's score as well as to the overall team score. Five points are awarded for each correct answer with a maximum of 100 points possible for the event.
- ✿ The examination will consist of 20 questions with multiple choice answers. Contestants will be given twenty minutes to answer the questions and record the information on the score sheet.
- ✿ The study guides for this event include:
 - **4-H Forestry Program Manual: Unit A—Trees**
 - **4-H Forestry Program Manual: Unit B—Forests**
 - **4-H Forestry Judging Contest Manual** (this booklet)
 - **Forest Trees of Oklahoma**

All questions on the quiz will come directly from these manuals. These references are available at the local OSU County Extension Office or at <http://nrem.okstate.edu/Extension/youth.html>

Keep in mind: While every contestant/team competes for awards on an equal basis, only Sr. Division Contestants are eligible for College Scholarships Awarded at Regional Contests. Additionally, only Sr. Division Teams are eligible to attend the National Invitational Forestry Judging Contests historically held in West Virginia.

Forestry Quiz Examples:

1. A tree is a woody plant with a single stem, well defined crown and is more than feet tall.
a. 5 b. 20 c. 50 d. 75

(The correct answer is **b**. See Page 3 of **4-H Forestry Program Unit A—Trees**)

2. The offspring of 2 different species often having greater vigor than the parent stock is:
a. habitat b. host c. hybrid d. lenticel

(The correct answer is **c**. See Page 31 of **4-H Forestry Program Unit A—Trees**)

3. DBH is: a. Diameter at breast height b. 4.5 feet above the ground
c. A standard accepted in forestry worldwide d. All of the above

(The correct answer is **d**. See page 19 of the **Oklahoma 4-H Forestry Judging Manual**).

4. A Gunter's chain is a unit of land measurement ____ feet in length.

a. 66 b. 100 c. 50 d. 6.6

(The correct answer is **a**. See page 8 of the **Oklahoma 4-H Forestry Judging Manual**).

5. Palmately compound leaves can be found on _____.

a. ash b. buckeye c. cottonwood d. dogwood

(The correct answer is **b**. See page 14 of **Forest Trees of Oklahoma**).

Forestry Quiz Example Scorecard:

Forestry Quiz (Scorecard)

Contestant Name _____

Contestant Number _____

County/4-H Club _____

Circle the correct answer (5 pts. For each correct response).

1. a b c d
2. a b c d
3. a b c d
4. a b c d
5. a b c d
6. a b c d
7. a b c d
8. a b c d
9. a b c d
10. a b c d

11. a b c d
12. a b c d
13. a b c d
14. a b c d
15. a b c d
16. a b c d
17. a b c d
18. a b c d
19. a b c d
20. a b c d

Contestant Score _____
(100 pts. Possible)

GLOSSARY OF FORESTRY TERMINOLOGY

Abney Level: a handheld surveying instrument used to determine a site's slope percentage

Aspect: a compass reading taken facing down a slope in the direction water would run; the direction toward which a slope faces.

Best Management Practices (BMP's): a practice or combination of practices, that is determined by a state to be the most effective, practicable means of preventing or reducing the amount of water pollution from soil erosion, chemical spills, etc.

Clinometer: a height measuring device.

Conservation: a term coined by Gifford Pinchot (a turn-of-the-century forester closely associated with President Teddy Roosevelt). Pinchot applied the word to describe a natural resource philosophy. It means—the protection, improvement, and wise use of natural resources according to principles that will assure their highest social and economic service over a long period of time.

Coppice: a forest stand originating from sprouts of stumps or roots of trees previously cut. Most hardwood species sprout readily when cut young. Very few conifers will sprout from the stump.

Crown Class: a designation of trees in a forest with branches and foliage (crowns) of similar development and occupying similar positions in the canopy. The following are the four commonly recognized classes:

Dominant: trees with crowns extending above the general level of the canopy and receiving full light from above and part from the side; larger than the average trees in the stand and with crowns well developed but possibly somewhat crowded on the sides.

Codominant: trees with crowns forming the general level of the crown cover and receiving light from above, but comparatively little light from the sides; usually having medium-sized crowns that are more or less crowded on the sides.

Intermediate: trees shorter than those in the two preceding classes, but with crowns either below or extending into the canopy formed by co-dominant and dominant trees, receiving a little direct light above, but none from the sides; usually with small crowns that are considerably crowded on the sides.

Suppressed trees with crowns entirely below the general level of the canopy (crown cover) receiving no direct light either from above or the sides.

Cull: a tree or log of merchantable size but with no market value due to poor form, limbiness, rot, or other defect.

DBH: Diameter at Breast Height—the diameter of a tree measured at 4 ½ feet above ground level on the uphill side of the tree.

Duff: forest litter and other organic debris in various stages of decomposition, on top of mineral soil.

Erosion: the wearing away of the soil and minerals by climatic agents such as wind and water.

Exposure: the portion of the slope directly in the path of wind, rain, and sun (open to the action of the elements).

Forest Land Capabilities: the productive capacity or usefulness of a site based upon its quality in reference to climatic factors, drainage, degree of slope and slope position; the productivity of the land as it is affected by a particular location or position on a slope.

Forest Types: a classification of species indicating the majority of the species, or the species represented in an area.

Germination: the resumption of growth of a seed; the development of a normal seedling from a seed; this process occurs when a viable seed meets favorable conditions which allows it to grow.

Girdle: to chop or remove a strip of bark or a section of wood containing the food-carrying tissue of a tree in an even strip around the tree or twig.

Harvest: the removal of marketable products from the forest.

Mature Tree: a tree that has reached the maximum growth needed to meet given merchantability requirements as determined by a forest manager.

Multiple Land Use: the practice of forestry which combines two or more objectives relating to timber, water, wildlife, grazing (forage), and recreation.

Merchantable Height: a term used to describe the marketable length of a tree.

National Forests: federal reservations administered by the Forest Service of the Dept. of Agriculture, dedicated to management by the multiple-use concept.

National Parks: federal reservations administered by the National Park Service of the Dept. of the Interior, established exclusively to conserve the scenery, the natural and historic objects, and the wildlife and plants within the reservation boundaries, and to provide for the enjoyment of these features in such manner that leave them unimpaired for future generations; often confused with national forests.

Old Growth: trees 200+ years of age, having large diameters and heights with multi-canopies of understory, mid-story, and upper story tree species; also includes large amounts of dead organic matter in the form of downed (fallen) woody debris, standing dead trees (snags), and large amounts of surface litter (duff).

Partial Cut: a method of harvesting in which a specific portion of a stand may be cut for a specific product or management objective; this usually implies a series of such cuttings such as shelterwood cut, selection cut, or seed tree cut.

Pole Timber: a young tree with a diameter (DBH) of 36 inches in the small pole stage and 6 to 12 inches in the large pole stage.

Prescribed Burn: the skillful application of fire to natural fuels under optimum conditions to accomplish certain planned benefits to one or more objectives of multiple-use management (i.e., water, wildlife, timber, grazing (forage), or recreation).

Preservation: term related to land use in natural resources, where areas and resources have been set aside for no use, limited use, or restricted use and development; preservation land use is often restricted to recreation or scientific research.

Reproduction: the natural or artificial establishment of seedlings or sprouts less than 1 inch DBH.

Residual Stand: the trees remaining after completion of a partial cut.

Sanitation Cutting: removal of dead, damaged, or susceptible trees undertaken essentially to prevent the spread of pests or disease pathogens, promoting forest hygiene.

Sapling: a young tree measuring from 1 to 3 inches DBH.

Seedling: a tree grown from seed; this usually refers to the stage in a tree's growth from germination to 1 inch in diameter with a general height of no more than 6 feet.

Silviculture: the art of managing the establishment, growth, and reproduction of forest stands by manipulating light, water, nutrients and other available resources.

Site: the combination of biotic, climatic, and soil conditions of an area with the ecological factors in reference to its capacity to produce forests or other vegetation.

Slope Position: a particular location on a slope, such as upper, middle, or lower slope, ridge top, or bottomland; a specific topographic location.

Snag: standing dead or dying trees; an important forest component that provides habitat for a wide variety of wildlife species.

Sprout: a tree or shoot originating from a root or stump.

Stocking: an indication of the number of trees occupying a stand compared to the number required for best growth and management; may be classified as: well-stocked, overstocked, or understocked.

Streamside Management Zone (SMZ): a strip of land adjacent to a water body or stream channel where soils, organic matter, and vegetation are managed to protect the physical, chemical, and biological integrity of surface water adjacent to and downstream from forestry operations. An SMZ may also be called a "filter strip" or "buffer zone."

Sustained Yield: management of a resource, such as a forest, to provide a constant supply of the resource (timber) and revenue.

Timber-Stand Improvement (TSI): any practice (other than a harvest activity) designed to improve a forest stand by removal of vines, cull trees, or undesirable species, enhancing forest composition, condition (health), or rate of growth.

Wilderness: in the strictest sense—an area that has never been developed by man; an area characterized by primitive conditions of transportation and habitation. The 1964 Wilderness Act defines it: "A Wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor and does not remain." This contains no provisions for the passage of motorized transportation, and excludes resorts, organizational camps, summer homes, and commercial logging. In common use, the word is associated with undeveloped areas and those set aside with a little development. In some cases manmade items are dismantled to reduce the area to a primitive state. Under broader uses, some roadless areas are considered wilderness when the access is limited to hiking, canoeing, or horse backing, and the use is set aside for recreation. To the general public, wilderness experiences are gained in a number of settings involving wild but not necessarily true "Wilderness" areas.

Wild Fire: a fire burning out of control regardless of how or why it was started.

Wolf Tree: term usually applied to a broad-crowned, short-stemmed tree that may occupy more space than its silvicultural value warrants, curtailing better growth of surrounding trees.

A SUMMARY OF FEDERAL LAWS AFFECTING FORESTRY

Laws form the legal basis for using and managing our nation's forests. Since 1890, more than 140 laws affecting forestry have been passed by the United States Congress and signed by the President. In the early years, most laws enabled or authorized the protection and management of the nation's forests. Many of the laws passed in recent years restrict or regulate the use and management of these forests. Some of the more important Federal laws are described below.

Creative Act of 1891: authorized the President of the United States to set aside public lands bearing forests as public reservations commonly called *Forest Reserves*.

Organic Administration Act of 1897: provided that the Forest Reserves, later to be called *National Forests*, was established to improve and protect the forest, to secure favorable conditions of water flow, and to furnish a continuous supply of timber.

Transfer Act of 1905: transferred the administration of the Forest Reserves from the United States Department of the Interior to the Department of Agriculture.

Twenty-five Percent Fund Act of 1908: established the procedure for paying the states twenty-five percent of the monies received from national forest timber sales to benefit public schools and public roads in counties where national forests are located. These payments are made in lieu of taxes.

Weeks Law of 1911: authorized purchasing and adding to the National Forest System forested, cutover, or denuded lands within the watersheds of navigable streams which are necessary to regulate the flow of navigable streams or to produce timber.

Smith-Lever Act of 1914: established a Federal-State Cooperative Extension program to provide education for the public in agriculture and natural sciences.

Clarke-McNary Act of 1924: authorized technical and financial assistance to the states for forest fire control and for production and distribution of forest tree seedlings. (Sections 1 through 4 were repealed by the Cooperative Forestry Assistance Act of 1978.)

McSweeney-McNary Act of 1928: authorized a comprehensive Forest Service research program. (This act was repealed and supplanted by the Forest and Rangeland Renewable Resources Research Act of 1978.)

Multiple Use Sustained-Yield Act of 1960: established a policy of multiple use, sustained yield management for the renewable resources of the National Forest System.

McIntyre-Stennis Act of 1962: established a cooperative forestry program for state land-grant colleges and universities.

Clean Air Act of 1963: gave the Federal government enforcement powers regarding air pollution for the first time. This act and subsequent amendments impact the forest industry by affecting prescribed burning for forest management and emissions from forest products manufacturing plants.

Wilderness Act of 1964: established the National Wilderness Preservation System by setting aside sections of federal forest land as wilderness.

National Environmental Policy Act of 1969: required environmental considerations be incorporated into all Federal policies and activities, and all Federal agencies prepare environmental impact statements for any actions significantly affecting the environment.

Federal Water Pollution Control Act Amendments of 1972: established as a national objective restoring and maintaining the chemical, physical, and biological integrity of the nation's water and required area wide planning to prevent future water pollution that could be associated with growth, development, and land use, including timber management.

Endangered Species Act of 1973: provided for the protection and conservation of threatened and endangered fish, wildlife, and plant species. Directs all Federal agencies to utilize their authorities and programs to further the purpose of the act.

National Forest Management Act of 1976: established additional standards and guidelines for managing the national forests, including directives for national forest land management planning and public participation.

Cooperative Forestry Assistance Act of 1978: authorized the Secretary of Agriculture to work in cooperation with State Foresters in nine cooperative forestry assistance programs. Among these programs is the *Forestry Incentives Program*, a federal cost-share program designed to encourage the management of private forest lands.

Renewable Resources Extension Act of 1978: authorized expanding the forest and rangeland renewable resources portion of the extension education program.

Forest and Rangeland Renewable Resources Research Act of 1978: authorized expanding forest and rangeland renewable resources research.

Reforestation Tax Incentives (part of the Recreational Boating Safety and Facilities Improvement Act of 1980): provided tax credits and deductions for landowners who reforest their property, as an incentive to encourage reforestation.

Food Security Act of 1985 (1985 Farm Bill): established the *Conservation Reserve Program*. The program was designed to conserve 4,045 million acres of highly erodible cropland by paying landowners to plant permanent vegetative cover, such as grass or trees, and maintain that vegetative cover for 10 years.

Food, Agriculture, Conservation, and Trade Act of 1990 (1990 Farm Bill): established the *Forest Stewardship Program*, designed to encourage multiple resource forest management on non-industrial private forest lands. A companion program, the *Stewardship Incentives Program*, was designed to provide cost-share assistance funding to encourage the implementation of management practices.

Coastal Zone Act Reauthorization Amendments of 1990: required that states with Coastal Zone Management Programs develop and implement Coastal Non-point Pollution Control Programs to control sources of non-point pollution (including managed forests) which impact coastal water quality.

This handbook was adapted from material prepared by the National 4-H Forestry Invitational Committee. The contest events are very similar to those conducted at the national level. The use of this handbook is intended to introduce Oklahoma 4-H members to the Forestry Judging Contest in such a way that they will also be prepared to compete at other levels (state, regional, and/or national).

The 4-H Forestry Project is sponsored on a national level by the International Paper Company. In this state, the Oklahoma Forestry Association, the Ouachita Mountains Resource Conservation & Development District, and the Cherokee Hills Resource Conservation & Development District are generous sponsors. Participation in this judging event can be a very rewarding learning experience and is a significant addition to other Oklahoma forestry-related project activities.

The Oklahoma Forestry Association supports this judging contest by providing awards for the various competitive events. Recognition and awards in the form of scholarships and other prizes are provided by Eastern Oklahoma State College in Wilburton, the Cherokee Hills RC & D, and the Ouachita Mountains RC & D, as well as numerous individuals and small businesses in the eastern Oklahoma area.

The 2007 revision was adapted from the National Guidelines and the former Oklahoma 4H Forestry Handbook by:
Dr. Kevin Allen, 4-H and Youth Development Specialist, Stillwater
Dr. Craig McKinley, State Extension Forester, Stillwater



OSU EXTENSION
4-H YOUTH DEVELOPMENT

Oklahoma State University, in compliance with Title VI and VII of the Civil Rights Act of 1964, Executive Order 11246 as amended, Title IX of the Education Amendments of 1972, Americans with Disabilities Act of 1990, and other federal laws and regulations, does not discriminate on the basis of race, color, national origin, gender, age, religion, disability, or status as a veteran in any of its policies, practices or procedures. This includes but is not limited to admissions, employment, financial aid, and educational services.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Robert E. Whitson, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President, Dean, and Director of the Division of Agricultural Sciences and Natural Resources at no cost to the taxpayer. 1007