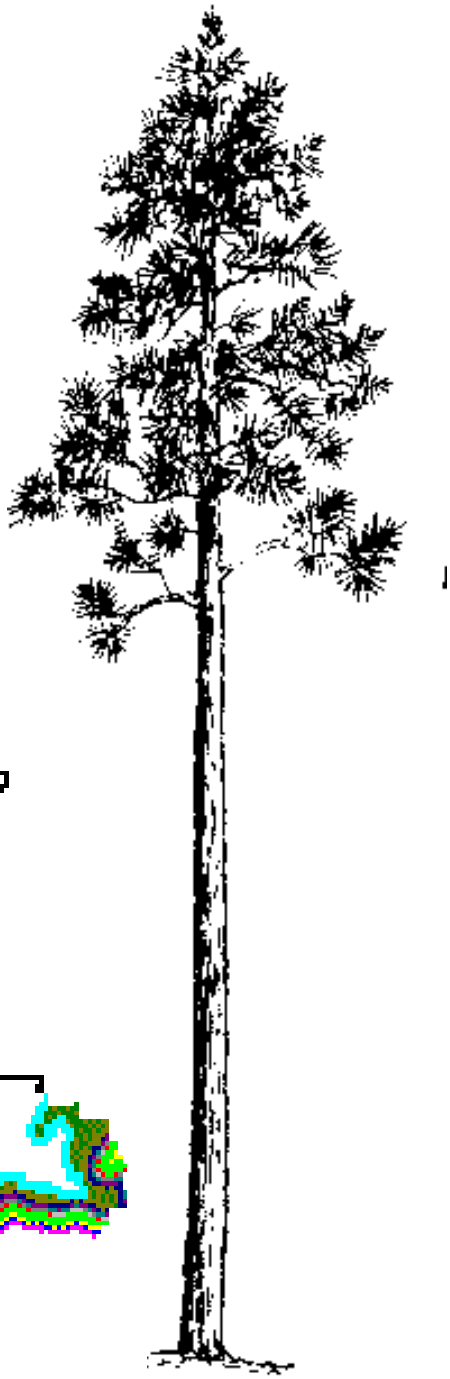
Southern Regional Woodland Clinic Handbook



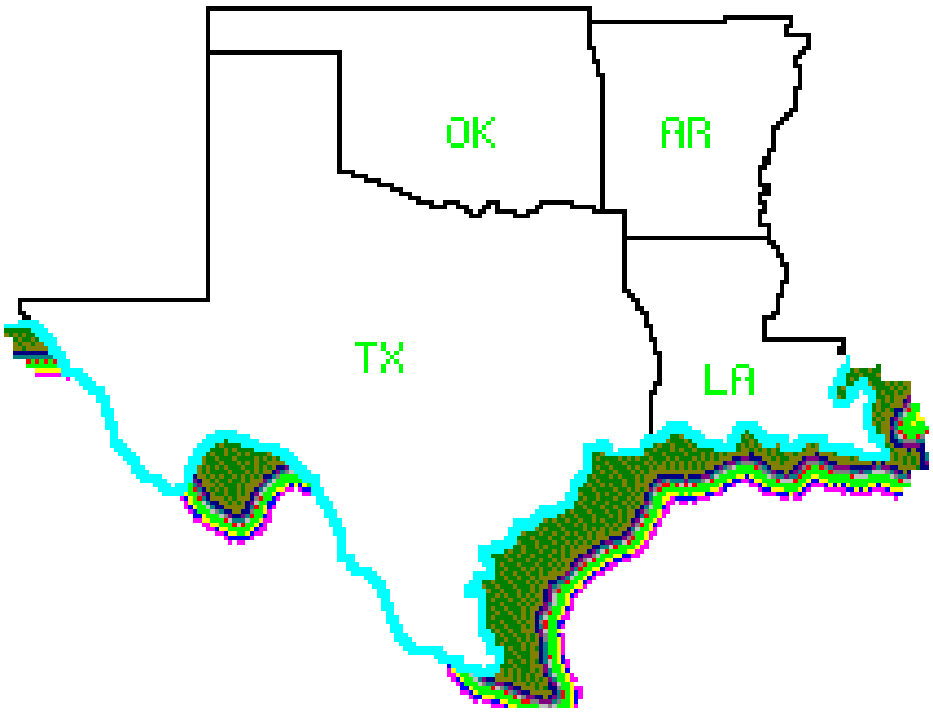


TABLE OF CONTENTS

Introduction 1

Objectives 1

Clinic Events

1. Hardwood identification 2
2. Pine Identification 3
3. Rate of Growth 4
4. Selective Thinning 6
5. Tree Volume 8

Volume Table and Tally Sheet 9

6. Wood Products 10
7. Site Index 12

Site Index Table and Figure 7A – Measuring Tree Heights 13

8. Timber Stand Improvement (TSI) and/or Thinning 14
9. Compass and Pacing 16

Appendix A General Rules 17

Appendix B Question Sheet and Score Sheet 19, 21

Appendix C Practice Compass Course 23

Regional Woodland Clinic Handbook

Introduction

Each year since 1984 a Southern Regional Woodland Clinic has been held in Arkansas, Louisiana, Oklahoma, or Texas for the purpose of providing young people with a working knowledge of forestry. The contest is sponsored by the Associations of Conservation Districts from each state, USDA – Natural Resources Conservation Service, Future Farmers of America, Cooperative Extension Service, and the state forestry agencies. The clinics are held between the four states on a rotational basis. Competition has generally involved two youth organizations – the 4-H clubs and Future Farmers of America.

The clinics provide and excellent opportunity where participants can gain considerable insight into what is involved in managing forestlands. They afford opportunities to train and talk with professional foresters who are involved with the management of company, public and private forests. For any young man or woman considering forestry as a possible career choice, this kind of experience can be extremely valuable.

Objectives

The State Associations of Soil and Water Conservation Districts have laid out four primary objectives for the Woodland Clinic. The first is to familiarize young people with the efforts of the soil and water conservation districts and to stress the proper use of woodlands, which is the predominant land use in Arkansas, Louisiana, East Texas and East Oklahoma. The second objective is to develop an awareness and understanding of the value of properly managed woodlands, to promote a greater appreciation for the renewable forest resources, ands to emphasize that forests are dependent upon the soil resource. The third objective is to teach these young people methods of developing and managing good commercial woodlands. The final objective is to teach multiple use of the forests which can be managed for wildlife, wood products production, recreation, water and other uses.

Woodland Clinic Events

In order to accomplish the objectives laid out by the state associations of conservation districts, woodland clinics are organized into nine separate events, each one addressing a particular forestry skill or art. In the pages that follow, each event will be explained.

Event 1 – Hardwood Identification

Throughout the South, and especially along creek and river bottoms, many hardwoods are found. Before anyone responsible for managing forestlands can prepare a management plan, he or she must be aware of what kinds of forest trees exist in an area and what those trees require for good growth and health. He or she must be able to recognize the kinds of trees he or she sees. Thirty-three different kinds or species of trees have been selected for identification in the woodland clinic (four pines and twenty-nine hardwoods, including eastern redcedar). In the clinic only ten hardwoods will be selected for identification for Event 1, but the contestant should know all the listed species because they don't know which ten he or she will be asked to identify in the contests.

At the beginning of the contest or event the contestant will be given a Score Sheet and a Question Sheet, The Question Sheet will contain the list of trees. When the contestant arrives at the Hardwood Identification event, he or she will be asked to identify ten hardwood trees designated by cards with letters printed on them. The contestant will enter the number for the species from the tree list on the Question Sheet that corresponds with the tagged tree.

Example: If the card with Letter "A" is on a water oak, the contestant would write the number 19 in the block under Question 1 because water oak is number 19 on the tree list found on the Question Sheet. See Figure #1.

Figure #1.

1. Hardwood Identification

A	19	B		C		D		E	
F		G		H		I		J	

Event 2 - Pine Identification

There are four major southern pine species found growing in the South. They are Loblolly Pine, Shortleaf Pine, Longleaf Pine, and Slash Pine. The first three species are native to the entire region while Slash Pine is native east of the Mississippi River, but has been introduced into the western gulf region. Because of the differences in the growth characteristics of these four different pine species, it is important that a land manager be able to tell them apart.

In this event, the contestant will have to identify five (5) tagged pine trees or branches. Obviously at least one species will be used twice. The four pine species are listed on the Tree List on the Question Sheet. The four pine species are numbered as follows:

23 – Loblolly Pine

24 – Longleaf Pine

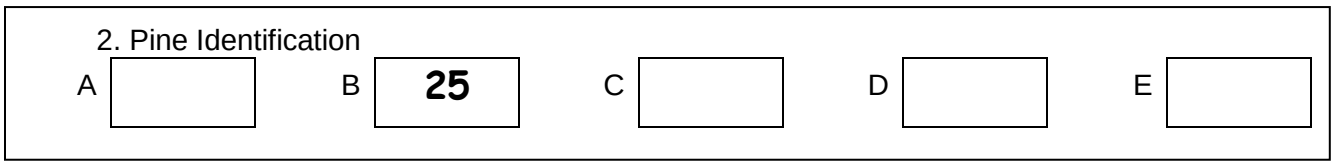
25 – Shortleaf Pine

26 – Slash Pine

The contestant will be shown five (5) trees or samples lettered A, B, C, D, and E. The number corresponding to the species of pine will be placed in the appropriate block on the Answer Sheet.

Example: If the card with the letter “B” identifies a Shortleaf Pine, the number 25 would be placed in Block B of the Score Sheet. See Figure #2.

Figure #2.



Event 3 – Rate of Growth

The factors that affect the rate of growth can be put into two categories: (1) site quality, and (2) past management. On sites with high site indices, such as well drained bottomlands, the time to grow two inches of diameter should be about five years whereas on site with low site indices, such as very deep sands, the time period would be closer to eight years. Five to eight years to grow two inches of diameter, therefore, is a good rule-of-thumb for determining the growth rates for most southern forested sites.

Although the site quality can be used to predict the potential growth rate, the stocking rate of the forest will determine what the growth rate will be. Trees that are crowded because the site is overstocked can have growth rates of twelve or more years per two inches of diameter growth. Crowded trees do not have the space to produce full crowns and so diameter growth will suffer. Forestry practices that solve this problem include selective thinning and timber stand improvement.

On the other hand, trees in stands that are understocked may have so much space for crown development that less than four years are needed to grow two inches of diameter. Although the amount of wood per tree is being rapidly produced, land may be wasted because the site is not growing the number of trees of which it is capable. So in general, if the trees are growing two inches of diameter in five to eight years, they are growing suitably for most sites. If they take more than eight years, they are growing too slowly and if fewer than five years, they are growing too fast.

Since the number of rings in the last two inches of diameter is the same as the last one inch of radius, the rate of diameter growth in a tree from which lumber is cut can easily be determined by the annual rings at the end of the board. The faster the growth, the wider the distance between the rings (and fewer number of rings per inch). The slower the growth, the closer the rings are spaced. Fast growth lumber tends to warp, have more shrinkage, knots, and sapwood, less density, and possibly less strength, depending on use. Generally, the slower the growth the better the lumber.

0 to 4 rings per inch = Too Fast
5 to 8 rings per inch = About Right
9+ rings per inch = Too Slow

In this event, contestants will examine three cross sections or pieces of lumber with an inch marked off on each. They will determine if the trees from which the lumber was cut were growing too fast, too slow, or about right. The number from the Question Sheet that describes the rate of growth for each sample will be placed in the appropriate blocks.

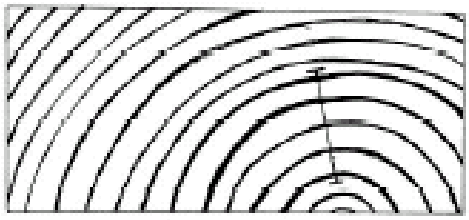
Example: If upon examining sample “A”, the contestant determines that there were ten rings per inch, he or she would put the number “2” in block A (2 = too slow). See Figure #3.

Figure #3.

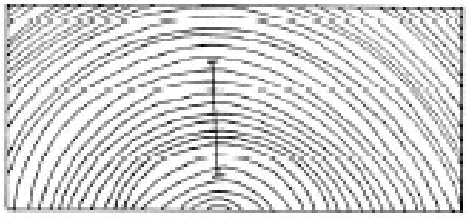
3. Rate of Growth

A **2** B C

Too Fast



About Right



Too Slow

Too Fast

About Right

Too Slow

Event 4 – Selective Thinning

Unless a stand of trees is properly stocked, neither the best woodland site not the maximum amount of care and protection can result in satisfactory growth. The landowner must have a method suitable for his use in selecting the kind and number of trees to grow a good wood crop. He also must understand that method in order to appreciate what is being done and why he should make a partial cut in his woodland to get optimum growth. To be acceptable to the landowner, there are three essential parts of any method for growing better wood crops:

- *Leave the best of what you have* – The better quality trees should be left in thinnings. Sometimes these may not be the ideal trees but long-range woodland management will always try to improve the quality of the stand
- *Space trees with room to grow but none to waste* – A fully stocked stand of desirable trees is the objective of good management. Maximum numbers are needed but each tree needs room to make normal growth or the stand will suffer
- *Establish a schedule for woods work* – Spacing of trees to have room to grow but none to waste dictates that additional thinnings must be planned at intervals to maintain optimum growth.

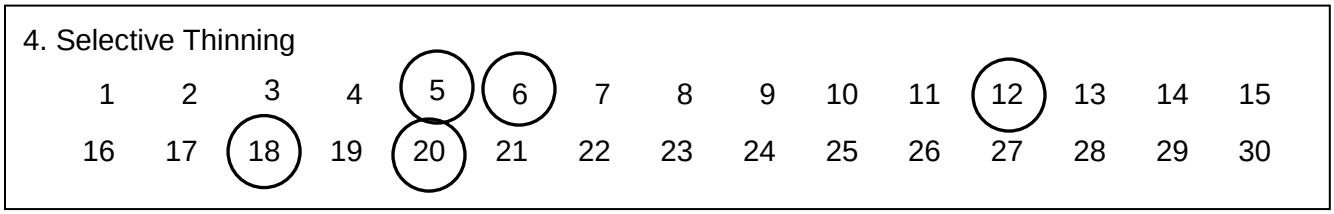
There are several ways in which most jobs can be done satisfactorily. Likewise, there are several methods by which landowners could grow a satisfactory wood crop. On most small woodland the following criteria should be considered:

- Thinnings must be heavy enough to provide volume for an economic operation.
- Thinnings should be light enough to permit the shortest time between thinnings necessary to grow the end product.
- The degree of thinning must be consistent with recognized good forestry practices.

In the woodland clinic all marked trees within a designated area will be considered. At least fifteen, but not more than thirty, trees will be marked. Using sound forest management principles and methods, the contestant will determine which trees should be **CUT**. He or she will then circle the corresponding number on the Score Sheet. This means that the trees that correspond to the uncircled numbers on the Score Sheet will be left in the thinning process.

Example: The contestant decides that the trees bearing the numbers 5, 6, 12, 18, and 20 should be cut to improve the quality and growth of the stand. He or she will circle these numbers on the Score Sheet. See Figure #4.

Figure #4.



Event 5 – Tree Volume

In this event the contestant will determine the total volume of five tagged trees by measuring the diameter of each at DBH (4½' above the ground) to the nearest **2 inch** class (E.g. – 10", 12", etc.) and the merchantable height in numbers of 16 foot logs to the nearest **½ log** (E.g. 1, 1½, 2, etc.) using a cruiser stick. The minimum top diameter for saw logs will be **8 inches**. For the Regional Woodland Clinic, trees with excessive roughness, limbiness, and whorls will be avoided. A Score Sheet and a timber tally sheet/Volume Sheet, which uses the Doyle Rule will be provided. Volume tables on the cruised sticks will not be used. Answers within 5% of the correct total volume will receive full credit; within 10%, half credit; and over 10%, no credit.

Using the Doyle Rule volume table provided, the contestant reads right from the diameter class measured at DBH to the column beneath the number of logs found in each tree. The number found in the table where the diameter and the number of logs intersect is the volume of lumber contained by the tree. This procedure is repeated for each tree, and the five volumes figures are added together to arrive at the total volume.

Example: In this event the contestant measure five tagged trees finding the following diameters and merchantable heights:

Tree No.	D.B.H	No. of 16' logs	Board Feet
1 -	16"	2½	143
2 -	16"	3	161
3 -	14"	2	82
4 -	12"	1½	39
5 -	14"	1½	67

The sum of the five volumes showed the trees had 492 board feet of lumber. This volume is entered in the block for Event 5 on the Score Sheet. See Figure #5.

Figure #5.

5. Tree Volume

492

VOLUME TABLE
Doyle Rule
Form Class 80

D.B.H. (Inches)	VOLUME (Board Feet) BY NUMBER OF 16 FOOT LOGS								
	1	**1½**	**2**	**2½**	**3**	**3½**	**4**	**4½**	**5**
10	16	20	23	24	26	28	31		
12	31	39	47	52	57	60	62		
14	52	67	82	93	104	109	114	120	126
16	77	101	125	143	161	174	186	199	213
18	108	144	179	206	234	254	273	293	314
20	144	193	242	282	321	348	374	396	417
22	185	250	315	368	420	458	497	529	561
24	231	314	397	466	536	583	630	678	725
26	282	386	489	576	663	727	791	852	912
28	339	466	592	700	807	885	963	1040	1118
30	400	552	703	832	961	1055	1149	1248	1346

Source: U.S. Forest Service

TALLY SHEET

Tree No.	DBH	No. of 16' Logs	Board Feet

TOTAL _____

Event 6 – Wood Products

A number of different wood products can be produced on properly managed woodlands. The main products of southern yellow pines, in order of decreasing value are: 1) Poles and piling, 2) Veneer logs and sawlogs, and 3) Pulpwood, chip-n-saw, and fence posts. The contestant will examine ten (10) trees and determine which forest product class each is suited. Each of the ten trees will be marked with a lettered tag and the contestant is to record the correct product code in the corresponding box on the Score Sheet. The codes are:

1- Poles and Piling
2- Veneer and Sawlogs
3- Pulpwood, Fence Posts

Poles and piling are the highest valued products from pine stands in the South. To qualify for this use, trees must be very straight for a minimum length of 30 feet. A test of straightness is to stand several feet from the tree and drop an imaginary plumb line from the middle of the tree at pole length (at least 30') to the ground. If the imaginary line stays within the wood from top to bottom, the tree is straight enough to qualify for a pole (based on straightness). This method should be used from at least two different views of the tree. In addition, the trees cannot have any ring knots (a point where several branches are on the body of the tree at roughly the same height). Ring knots create areas of weakness in the pole or piling and are subject to breakage more readily than areas without them. The minimum length for a pole in the woodland clinic will be 30 feet. The top diameter must be at least 6 inches, outside the bark. Minimum diameter at DBH is 8 inches. Pilings have the same standards for straightness and lack of ring knots as poles. However, pilings tend to be much larger in top diameter.

Sawtimber and veneer logs are the next most valuable wood products obtained from southern yellow pines. To qualify as a sawlog or veneer lag, the minimum DBH is 10 inches and the length must be at least 1 log (16 feet). Sawlogs may have knots or limbs on them, provided they are not excessive, but veneer logs must be practically branch and knot free. Both sawlogs and veneer logs must be relatively straight but not as straight as poles and piling material.

The third category includes pulpwood, and fence posts. For the purposes of the woodland clinic the term pulpwood is used to describe a tree size and quality class as well as a forest product. Included in this class are: Chip-n-saw, OSB, and Pulpwood. Chip-n-saw refers to a sawing method in which trees in the pulpwood DBH class are cut into lumber (usually 2x4s) and the remaining slabs are chipped for use in pulp and paper manufacturing. Chip-

n-saw trees typically are somewhat more valuable than trees used for pulp and paper production. OSB (Oriented Strand Board) is a panel product (like plywood) made of wood chips pressed and glued together. Pulpwood trees are used for paper and pulp manufacturing. To qualify for the Pulpwood and Fence Post class of trees, the DBH must be at least 6 inches. In some cases, trees may be sold for fence posts with top diameters as small as 2½ inches inside the bark.

Example: A tree in this event is tagged with the letter "D". It is 14" DBH and has two large braches at heights of 8 feet and 20 feet. The contestant decides that the tree is best suited for sawlogs and puts the code "2" in the corresponding block on the Score Sheet. See Figure # 6.

Figure #6.

6. Wood Products

A		B		C		D	**2**	E	
F		G		H		I		J	

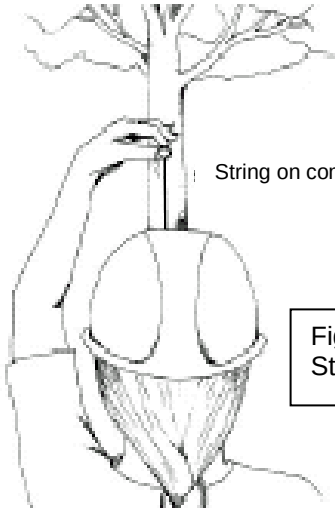


Fig. 6A Testing Straightness

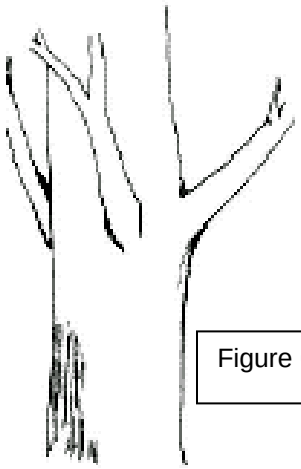


Figure 6B Ring Knot

Product Requirements:

Product Class	Min. DBH	Min. Top Diameter	Min. Height	Straightness Test	Ring Knots	Limbiness
Poles and Piling	8"	6"	30'	Yes	None within 30'	Limb free within 30'
Veneer and Sawlogs	10"	N / A	1 log	No	N / A	Permissible if not excessive
Pulpwood and Fence Post	6"	2½" for Fence Posts	N / A	No	N / A	N / A

Event 7 – Site Index

Site index is an indicator of the productivity of a woodland site. Soil is a factor that greatly influences productivity and therefore the site index. In addition, local climatic conditions influence tree growth and development. The site index number is the height that the average dominant trees in a stand can be expected to reach at a base year. Typically for southern yellow pine this base age is 50 years (which is used in the Southern Regional Woodland Clinic), but can also be 25 years (typically used by forest industry). Site index is determined by measuring the average height of the dominant and co-dominant trees in an even-aged stand and relating this to the average tree age.

The contestant will be given a site index table and have access to either a cross-section or increment core sample for this event. He or she will use the cross-section or increment core to determine the assumed age of a tagged tree by counting the rings. The number of rings will be used for the age and nothing will be added to this count. The total height of the tagged tree will be determined by each contestant. It should be remembered that the site index refers to the total height of the tree and not the merchantable height. The contestant may need to round the age to the nearest five years and the height class for that age class when determining the site index due to the construction of the site index table.

The site index table is used by reading down the left hand column to the nearest age; across to the nearest height; and then back up to the top row for the correct site index. Site indices are given in 5 foot intervals. Interpolation will not be required.

Scoring will be:

Full Credit -	Correct site index
Half Credit -	Plus or minus 5 feet of the correct site index
No Credit -	More than 5 feet from the correct site index

Example: The contestant counted 45 rings on the provided cross section and measured the height of the tagged tree to 75 feet. Using the table, he or she finds the site index to be 80 and enters this into the block for Event 7 on the Score Sheet. See Figure # 7.

Figure #7.

7. Site Index

80

SITE INDEX TABLE

Total Age (Yrs)	Site Index														
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120
	Height of Dominant Trees in Feet														
10	16	18	20	22	25	26	28	30	32	34	35	37	39	41	43
15	22	25	28	31	34	36	38	40	43	45	47	50	52	54	57
20	28	32	35	38	42	44	47	50	53	56	58	61	64	67	70
25	34	38	41	45	49	52	55	58	62	66	70	73	76	80	83
30	39	43	47	51	55	59	63	66	70	74	78	82	85	89	93
35	43	48	52	56	60	64	68	72	77	81	85	90	94	98	102
40	46	50	55	60	64	68	73	78	82	86	91	96	100	105	110
45	48	53	58	62	67	72	77	82	86	91	96	101	106	110	115
50	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120
55	52	57	62	68	73	78	83	88	93	98	104	109	114	119	124
60	54	59	64	70	75	80	85	90	96	102	107	112	117	122	128
65	55	60	66	72	77	82	87	92	98	104	110	115	120	126	131
70	56	61	67	72	78	84	89	94	100	106	112	116	123	128	133
75	57	62	68	74	79	85	91	96	102	108	114	119	124	130	135

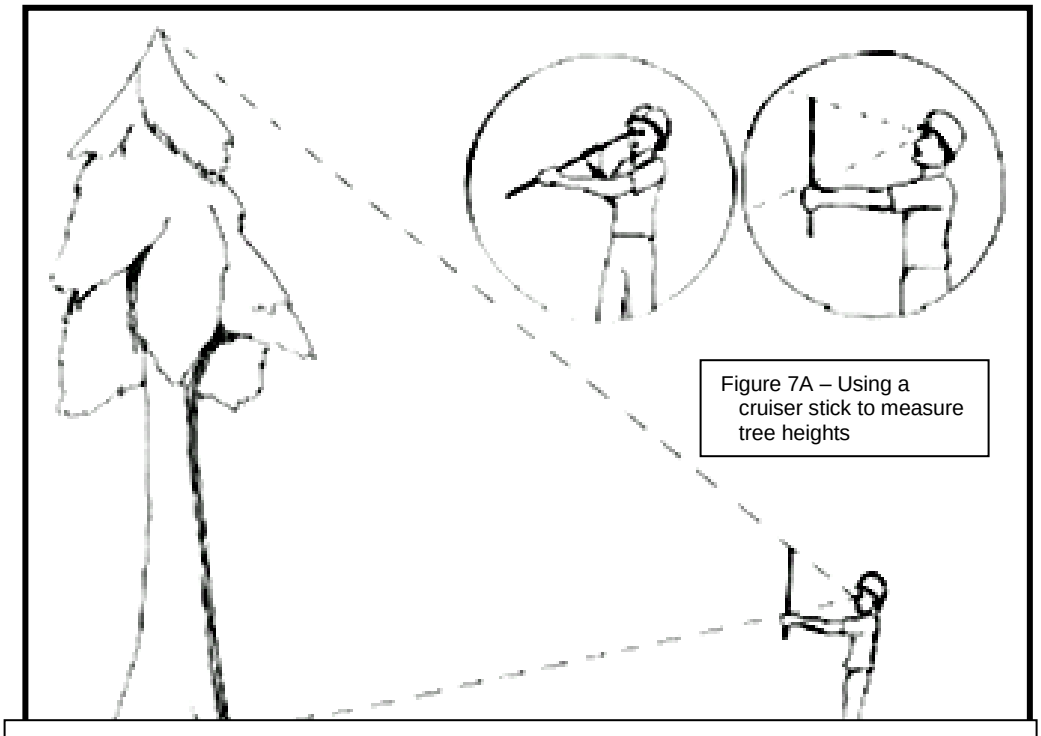


Figure 7A – Using a cruiser stick to measure tree heights

Since the distance from the eye to the stick equals the height of the stick (above the hand), then the distance from the eye to the tree equals the height of the tree.

Event 8 – Timber Stand Improvement (TSI) and/or Thinning

Exercising proper judgment in removing poor quality trees from timber stands at the opportune time is essential to the overall health, vigor and value of a timber stand. It also allows landowners a larger return on investments.

THINNING – Overstocked stands (those becoming crowded) should be thinned to give the remaining trees more space in which to grow in size and value. Methods used in thinning should include:

- Determine which species of trees (pine, red oak, white oak, etc.) should be left.
- Select the "leave" trees based on condition, value, size, vigor, spacing and importance in the landowner's goals and objectives.
- Remove trees that are overtopped by others, damaged, diseased, deformed, stagnated, or the poorest of a crowded group that are poorly spaced.

TSI - Timber Stand Improvement will eliminate woody vegetation, undesirable species, and commercially cull trees that prevent or restrict the growth and development of desired trees and forage plants. Only those trees that are harmful to the orderly execution of the landowner's management plan should be deadened. Often low grade or undesirable species of hardwood can be sold. This approach should be considered with the assistance of a forester before TSI work is started. Also, some culled trees and low quality species may be considered from the wildlife standpoint.

In the woodland clinic, an area of up to 30 feet in radius will be selected and marked with flagging, paint, rope, etc for this event. It will contain at least 15, but not more than 30, trees that will represent a timber stand that needs thinning and/or some TSI work. The trees may be all of one species or a mixture. The trees will be numbered. If it happens that the area selected and marked has more than 30 trees, the ones not needed for this event will be marked with an "**X**" and will not be considered for evaluation. All trees, with the exception of any "**X**" trees, in the area will be considered as a forest management site, and each will be scored by the contestant using one of the following options and codes:

A - Cut - Thin out or harvest the tree.

B - Leave - Tree should remain in the stand for a good reason.

C - Deaden - Undesirable tree, not merchantable or beneficial to wildlife, should be deadened or cut down.

Contestants will be provided the following information that will be needed to make their decisions:

- Forest management objectives
- Available timber markets, including for hardwoods
- Wildlife habitat considerations
- Present condition of the stand
- Final goal of the management plan

This information will be given to the contestants at the site before they start their evaluation of the stand. It will be given either orally, by a poster, or on a "hand-out" sheet.

Example: The contestant determine that the tree marked as "1" should be left, while the trees marked with "2", "3", and "4" should be cut and sold, and that tree "5" should be deadened. Using the codes listed above and on the Question Sheet, he or she will place a "B" in Block 1, an "A" in Blocks 2, 3, and 4 and a "C" in Block 5 of the Score Sheet. See Figure # 8.

Figure #8.

8. Timber Stand Improvement (TSI) and/or Thinning

1	B	2	A	3	A	4	A	5	C	6	
7		8		9		10		11		12	

Event 9 – Compass and Pacing

The ability to use a compass and to pace accurately in a forest situation are important skills. In this event, the contestant will be cover a course which will have two legs (the total distance will not exceed 6 chains or 396 feet) with a change in direction between the first and second leg. He or she will be given the direction and distances for each leg. Both azimuths and bearings for directions and chains and feet for the distances will be given. The contestant may use either. Beginning at a designated starting point, the contestant will travel the first direction and distance. When he or she reaches the end point of the first leg, the contestant will follow the direction and distance for the second leg. Both sets of directions and distances will be given to the contestant before he or she leaves the starting point. When the final end point is reached, the contestant will be scored on how close he or she came to the correct end point. The course at the clinic may have several end points and so the contestant must follow his or her own set of instructions to find the end point that is correct for his or her starting point. Points will be awarded as follows:

Within 15 feet -	Full Credit
Within 30 feet -	Half Credit
Over 30 feet -	No Credit

Example: The contestant is given a set of instructions for starting point 1 that provide the following directions and distances:

STARTING AT POINT 1:
70^{O} ($N70^{O}E$) - 3 CHAINS (198 FEET)
THEN:
123^{O} ($S57^{O}E$) - 2 CHAINS (132 FEET)

After completing the two legs of the course the contestant finishes within 9 feet of the correct end point. His or her answer sheet will be graded with 10 points. See Figure #9.

Figure #9.

9. Compass and Pacing

Score **10**

General Rules

Contest rules: The Southern Regional Woodland Clinic handbook will be used. Score ties will be broken by Question 5, Tree Volume.

Woodland Clinic Events

1. Hardwood Identification
2. Pine Identification
3. Rate of Growth
4. Selective Thinning
5. Tree Volume
6. Wood Products
7. Site Index
8. Timber Stand Improvement (TSI) and /or Thinning
9. Compass and Pacing

The contest will be divided into stations containing one or more events. Teams will be divided among the stations and the groups will move from one station to another at the sound of a horn.

Equipment and Materials: The following equipment will be needed by each contestant:

- Clipboard
- Pencil(s)
- Tree Scale Stick
- Compass
- Calculators may be used but are not required

Question and Answer Sheets will be provided either before the contest or at each station. Volume and Site Index tables will also be provided. Contestants should not use the volume figures printed on their scale sticks.

Awards will be presented following lunch

Team Awards will be presented to the top four FFA teams and to the top three 4-H teams.

Individual: An award will be given to the contest's high point individual.

Rules during the contest: Contestants will refrain from talking, horse-play, and the use of tobacco. The occurrence of cheating will be determined and dealt with by the staff at the station.

SOUTHERN REGIONAL WOODLAND CLINIC
Question Sheet

1. Hardwood Identification – Use the numbers listed below to identify the tagged trees.

2. Pine Identification - Use the numbers listed below to identify the tagged pines &/or branches.

Tree List

1.	American Beech	12.	Elm	23.	Loblolly Pine
2.	American Holly	13.	Flowering Dogwood	24.	Longleaf Pine
3.	Ash	14.	Hickory	25.	Shortleaf Pine
4.	Black Cherry	15.	Honey Locust	26.	Slash Pine
5.	Black Tupelo, Blackgum	16.	Blackjack Oak	27.	Red Maple
6.	Black Walnut	17.	Post Oak	28.	Red Mulberry
7.	Black Willow	18.	So. Red Oak	29.	Sassafras
8.	Common Persimmon	19.	Water Oak	30.	So. Magnolia
9.	Eastern Cottonwood	20.	White Oak	31.	Sugarberry, Hackberry
10.	Eastern Redbud	21.	Willow Oak	32.	Sweetgum
11.	Eastern Redcedar	22.	Pecan	33.	Sycamore

3. Rate of Growth – For quality lumber and economical growth, the marked cross-sections or pieces of lumber were growing:

   1 – Too Fast 2 – Too Slow 3 – About Right

4. Selective Thinning – Circle the number corresponding to the tagged tree that should be **CUT.**

5. Tree Volume – Calculate the total volume in board feet of the five (5) tagged trees.

6. Wood Products – Each of the ten (10) tagged trees will normally bring the most income if sold as:

   1 – Poles or Piling 2 – Sawlogs or Veneer Logs 3 – Pulpwood or Fence Posts

7. Site Index – Determine the proper site index for the tagged tree.

8. Timber Stand Improvement (TSI) and/or Thinning – The stand of timber could best be managed according to the landowner's objectives if each of the tagged trees were:

   A – Cut and Sold B – Left C – Deadened

9. Compass and Pacing – Complete the assigned compass and pacing course.

SOUTHERN REGIONAL WOODLAND CLINIC
Score Sheet

Team No. _____

Score _____

1. Hardwood Identification

A	B	C	D	E
F	G	H	I	J

2. Pine Identification

A	B	C	D	E

3. Rate of Growth

A	B	C

4. Selective Thinning

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	39

5. Tree Volume

6. Wood Products

A	B	C	D	E
F	G	H	I	J

7. Site Index

8. Timber Stand Improvement (TSI) and/or Thinning

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30

9. Compass and Pacing

Score

Practice Compass Source

Instructions on setting up course

- Choose a wooded area that is fairly level and free of dense underbrush. Using the directions below, the course will run in a northerly direction.
- Establish 5 starting points in an east-west line exactly 11 feet apart. Facing north, number the starting points from left to right.
- From midway between starting points 1 and 2, measure exactly 297 feet North (magnetic) and drive an end point stake. This will be the end point for all 5 courses.

Course directions

From Starting Point #1,
Go N20^{O}W (340^{O}) - 198 feet (3 chains)
Then N33^{O}E (33^{O}) - 132 feet (2 chains)

From Starting Point #2,
Go N33^{O}W (327^{O}) - 132 feet (2 chains)
Then N20^{O}E (20^{O}) - 198 feet (3 chains)

From Starting Point #3,
Go N17E^{O} (17^{O}) - 198 feet (3 chains)
Then N35^{O}W (325^{O}) - 132 feet (2 chains)

From Starting Point #4,
Go N26^{O}E (26^{O}) - 132 feet (2 chains)
Then N26^{O}W (334^{O}) - 198 feet (3 chains)

From Starting Point #5
Go N27^{O}W (333^{O}) - 198 feet (3 chains)
Then N23^{O}E (23^{O}) - 132 feet (2 chains)

Changing direction of travel

For directions other than North, the course should be set up as follows:

- Determine the azimuth of the desired direction of travel.
- Establish 5 starting points 11 feet apart on a line perpendicular to the desired direction of travel. Facing the direction of travel, number the starting points from left to right.
- From midway between starting points 1 and 2, measure 297 feet in the direction of travel and establish the end point.
- Revise the bearings and azimuth by adding the azimuth reading of the desired direction of travel to the azimuth readings for each starting point. If a resulting reading is greater than 360, subtract 360 from it to get the revised reading. Change the bearings to correspond to the azimuth readings.