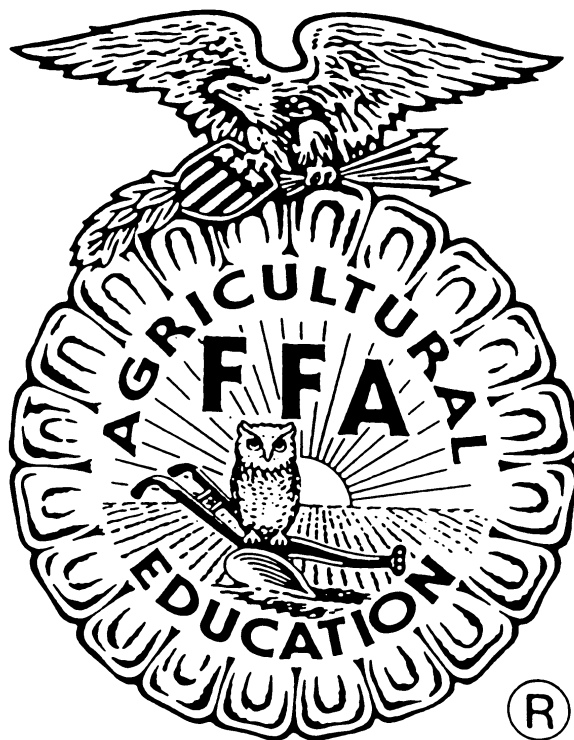


***FORESTRY
CAREER DEVELOPMENT EVENT***

RULES AND REGULATIONS

TEAM COMPETITION



ALABAMA FFA ASSOCIATION

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Alabama State Department of Education, Dr. Ed Richardson, Interim State Superintendent of Education

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Revised September 2017
Forestry CDE

FORESTRY CAREER DEVELOPMENT EVENT

PURPOSE

To stimulate interest and to promote forestry instruction in the Agriscience Education curriculum as well as to provide recognition for those who have demonstrated skills and competencies as a result of instruction in forestry.

ELIGIBILITY AND REGULATIONS

For specific eligibility of participants, refer to the Contests and Awards Booklet.

North District Only: Teams winning county events will be eligible to compete at the district level. An elimination event at the county level must be held to determine the county winner. Only the winner from each county in a district is eligible to participate in the district event. The County Chairman is responsible for planning the county event before the district event is held.

Central and South Districts will be open to all chapters at the district level.

The top four place winners in the North, Central and South Districts will compete in the state finals.

ALTERNATE POLICY

For district level events, if a chapter brings alternates there will be no more than two alternates allowed per team. Alternates will use a copy of the scan form (not an original) for those events scored via judgingcard.com. If more than four official scan forms are turned in for a chapter in one event, the highest score(s) for that team will be disqualified and deleted until the chapter only has four team members in the scoring system. Alternates must not be in groups with official team members.

For state level events, alternates are not allowed

STATE AWARDS

Please refer to the Contest and Awards Booklet on the Forms/Applications page of www.alabamaffa.org.

SPONSORS

Alabama Forestry Association
National FFA Foundation

GENERAL EVENT RULES

1. The teams competing in this event will be composed of a maximum of four members. The top three scores will be counted while the lowest score will be dropped. In the field phase, participants will be divided into four groups and will be allowed 20 minutes to complete each of the six parts.
2. No persons will be within the perimeter of an event, unless they are participants or a judge. Once participants have started an event, they will not be allowed to talk with anyone other than a judge until the event has been completed.
3. Binoculars can be used during the forestry event.
4. The site for the state event will be different from sites of local, county, and/or district eliminations.
5. The following materials will be necessary -- clean, covered clipboard or writing board, pencil, tree scale stick (purchased or made), compass and paper. Calculators may be used during the event. Participants will not be allowed to attach anything to the tree scale stick. Equipment may not be shared between team members.
6. The use of tobacco is not permitted during the event.
7. The event will consist of five phases.

Phase 1. General Knowledge Examination (District and State optional at county level). Fifty minutes (*30 minutes at State event*) will be allowed to complete this phase. Questions dealing with site index will be included in the General Knowledge Examination. *State Event only: Phase one will include Equipment ID.*

Phase 2. Timber Cruising/Estimating -- *Sawtimber from standing trees.*

Phase 3. Timberstand Improvement (TSI) – Written management objectives will be given.

Phase 4. Tree Identification

Phase 5. Compass Course

Phase 6. Team Activity (State only): Map Interpretation (Odd years)
Tree Disorders (Even years)

Note: In years that tree disorders will be given, judges may use all or part of the equipment ID portion of the scorecard for tree disorders. (Twenty tree disorders may be given or 10 disorders and 10 equipment ID.)

8. Tree measurements will be made by the official judges with a diameter tape and either a clinometer or abney level. *Officials will round ½" diameters DOWN. Example: A tree that measures exactly 10.5 will be recorded as a 10" DBH.*
9. The official study guides are 100 Forest Trees of Alabama, Developing Farm Woodlands in Alabama, and FFA Forestry Test Bank.
10. Team Tie Breakers:
 - A. If a tie still exists, the team with the highest combined cruising score (top 3 scorers) will be the winner.
 - B. If a tie still exists, the team with the highest combined tree I.D. score (top 3 scorers) will be the winner.
 - C. If a tie still exists, the team with the highest combined TSI score (top 3 scorers) will be the winner.
11. Individual Tie Breakers:
 - A. The individual with the highest cruising score will be the winner.
 - B. If a tie still exists, the individual with the highest tree I.D. score will be the winner.
 - C. If a tie still exists, the individual with the highest TSI score will be the winner.
12. Notice! Written management objectives will be given for TSI.
13. The written test and team activity will be given on the scheduled day. The field portion will be conducted in the morning of the scheduled day, weather permitting. If cancelled due to weather, the field portion will be conducted at 8:00 a.m. on the following day. The decision to cancel the field portion will be made by a representative of Agriscience Education and the official judges.
14. Compasses cannot be used to help determine tree height.
15. Participants are not allowed to touch or move the stakes in the compass course phase of the event.
16. Plants can be handled as long as there is no damage to them.
17. Participation by "alternates" (other than 4th member drop score) in County and District events is left to the discretion of the officials involved. Only official team members (3 + 1 drop score) will be allowed to participate in the State event.
18. Cell phones and other electronic devices (other than standard pocket calculators) are NOT to be used during the event. If a cell phone is seen or heard in the possession of a competitor, that individual student will be disqualified from competition and receive a score of zero.

19. Competitors must enter their name on the scorecard or they will receive a score of zero. Judges will not attempt to figure out who the card belongs to.

EVENT PHASES

Phase 1 -- GENERAL KNOWLEDGE EXAMINATION

Fifty (50) objective-type, multiple-choice questions will be selected from areas of the forestry industry. This phase of the event will test the participant's knowledge and understanding of basic principles of forestry. Each participant will be allowed 50 minutes (30 minutes at State Event) to complete this phase of the event. Each answer has a value of two points for a total maximum score of 100 points on the written test. The written test is optional at the county level and is mandatory (required) at the district and state levels. Questions will be taken from the reference, FFA Forestry Test Bank. Site index will be addressed in the General Knowledge Examination. (Example: interpreting a site index chart.) State Event only: Phase one will include Equipment ID.

Phase 2A -- TIMBER CRUISING/ESTIMATING

1. A tree scale stick will be used. The tree scale stick may be purchased commercially or homemade.
2. A plot will be selected for sawtimber, weight (pine) or volume (hardwood) estimation. Event administrators should select sites that do not have dense stands in order for participants to have sufficient time to measure all marked trees. A plot will consist of a range of 8-10 trees. If more than 10 sawtimber trees are on the plot, then a less dense stand should be selected. It is not necessary to have 10 trees in a plot, but 10 will be the maximum.

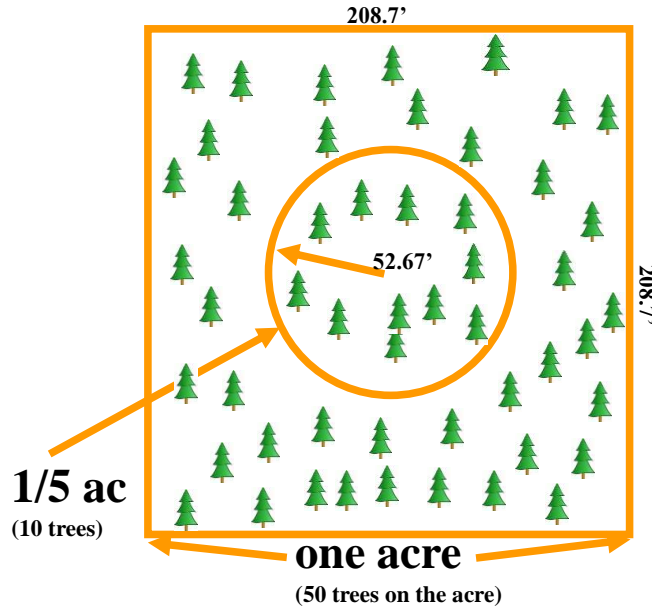
Explanation of the Timber cruising procedure:

In the timber cruising exercise portion of the Forestry event we assume the 4 to 10 trees to be measured are on a 1/5 acre plot (20% SAMPLE) on a one acre tract.

You should look up the bd ft volume (for hardwood) or the weight (for pine) for each tree measured (from the table provided). Add these bd.ft. volumes or weights. This total is the volume or weight of the sample (1/5 ac or 20%). In order to "blow up" or "expand" the 1/5 acre sample total to represent the volume or weight per acre, multiply this total by 5 ($5 \times 20\% = 100\%$)

NOTE: For CDE purposes it is assumed that there are no more than 10 trees on the 1/5 acre. (CDE judges can give as few as 4 trees for the exercise) However, in most sawtimber stands there will actually be more than 10 merchantable trees On a 1/5 acre (20 to 40 for the average sawtimber stand, or 100 to 200 trees per acre)

Participants will be required to give the total weight (in pounds) for pine sawtimber or a total volume (BF Doyle rule) for hardwood sawtimber on one acre by assuming the fifth-acre plot as representative of the whole area.



Note: If the trees in the stand illustrated above were uniform in size, quality and species this sample would give a reasonably accurate volume/weight for that single acre. **HOWEVER** rarely is a stand that uniform. In practice to get an accurate estimate for the entire tract the cruiser may take one plot for each acre on 20 to 40 or more acres, with the plots well distributed over the entire tract. This procedure when, done correctly, will yield a fairly accurate estimate. If the cruiser wanted a total for a single acre alone he would need to measure and tally every tree.

3. Participants will be given 20 minutes to measure the diameter and height of trees, followed immediately by a 20-minute period to complete weight or volume calculations. No talking during the calculation period.
4. Using a scale stick, each participant will measure pre-numbered trees on a 1/5 acre plot for tree volume and weight. The participant must record the D.B.H. to the nearest inch and the merchantable height of each tree. Height is rounded down to the nearest 8' half-log.

| Height | No. of Logs | Height | No. of Logs |
|--------|-------------|--------|-------------|
| 16 | 1 | 16-23 | 1 |
| 24 | 1½ | 24-31 | 1½ |
| 32 | 2 | 32-39 | 2 |
| 40 | 2½ | 40-47 | 2½ |
| 48 | 3 | 48-55 | 3 |
| 56 | 3½ | 56-63 | 3½ |

| | | | |
|----|----|-------|----|
| 64 | 4 | 64-71 | 4 |
| 72 | 4½ | 72-79 | 4½ |
| 80 | 5 | 80-87 | 5 |

The minimum log will be 10 inches D.B.H. and 1 log merchantable. All designated trees must be measured and recorded.

5. Each tree weight for pine will be found in the pounds per tree (Table 1). Or each tree volume (BF Doyle) for hardwood (Table II). The appropriate table will be furnished at the event. The weight table is shown on page 12. Record pine sawlog weights as found in the table; OR hardwood volumes will be recorded from the BF Doyle volume table (Table II page 13). Total all sawlog weights or volumes after all trees have been estimated.
6. Three points will be awarded for each correct D.B.H. and number of 16' logs.
7. Forty points will be allowed for the correct total **pine sawtimber weight or hardwood volume (BF Doyle rule)** per acre. REMEMBER -- the total weight OR volume will be the weight OR volume on the representative one acre (five times the total weight OR volume of the 1/5 acre plot).
8. Five (5) points will be deducted for each 5% plus or minus from the correct measured weight or volume. (See Score Card on pages 12-13)
9. It is recommended that event officials use 9" white paper plates to identify sawtimber trees.
10. Event officials will not select trees that the log tables will not accommodate (Tables I and II).

MEASUREMENT OF STANDING TREES STUDY GUIDE

PURPOSE: Standing trees are measured to obtain an estimate of the amount of various products which might be cut from the tree. This is done to have an idea of what weight or volume is present. Most timber sales are based on weight (tons). All forest properties must have some estimate of total weight (tons) on the tract, weight (tons) per acre, and weight (tons) by product so that the forest manager can decide the course of his/her future actions.

PRODUCTS: Forest products which may be measured are poles and piling, sawlogs, veneer logs, pulpwood, and fence posts.

METHOD Since all trees are basically a part of a cylinder, they have diameter and height which may be measured. Diameter of standing trees is measured at 4½ feet above ground level standing on the uphill side of the tree. This is abbreviated as D.B.H. (diameter breast high). The way to determine diameter will be explained in detail later. Height of a standing tree might be measured as total, the entire height from ground line to the top, or merchantable. This is a variable point, depending on the product which might be cut. If a tree might make a pole or piling, the height used will be measured in feet, by multiples of 5'. The top diameter is fixed by certain specifications. If a tree is to be cut into logs, the lengths cut will vary, depending on the demand of the mill to which the logs will go. This is true of sawlogs, as well as veneer logs. As a result, total merchantable lengths will vary. For this event, trees suitable for logs will have a top limiting diameter of 8" (for CDE purposes disregarding whirles and limbs and other defects).

TOOLS: To measure diameter, one may use a caliper, diameter tape, or tree scale stick. Since the tree scale stick is to be used in the event, the method of using it will be explained. Figure 1 shows how the tree scale stick is used to secure tree diameter.

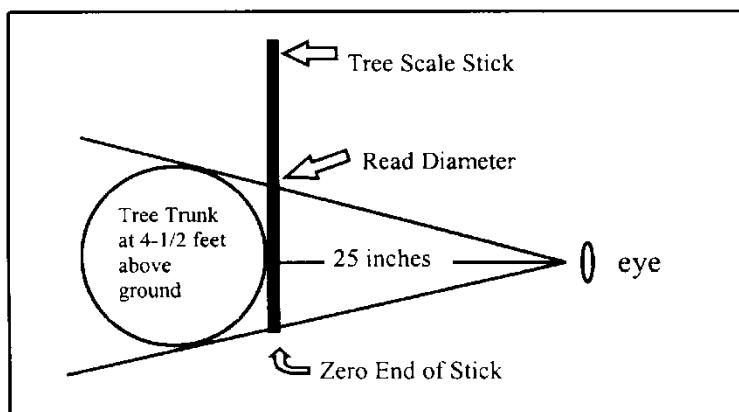


FIGURE 1: Method of using tree scale stick to obtain tree diameter. DO NOT MOVE HEAD, JUST EYE.

USING A TREE SCALE STICK: Use the flat side of the stick, indicated "Diameter of Tree" (in inches). TREE SCALE Hold the stick level at 25 inches from the eye, against the tree, at a STICK height of 4 1/2 feet above ground.

For those students whose arm reach is less than 25 inches, the following formula may be used to determine reach:

Scale graduations for the Biltmore stick may be computed by this formula,

$$\text{D.B.H. graduation} = \sqrt{\frac{AD^2}{A+D}}$$

Where A is the fixed distance from the eye to the stick in inches and D is any selected tree diameter in inches.

On commercially manufactured Biltmore sticks, diameter graduations are usually based on a fixed distance of 25 inches from the observer's eye to D.B.H. However, foresters may construct sticks based on a different arm reach by use of the preceding formula (Avery, 1959).

$$\frac{\text{Arm reach (inches)}}{\text{Distance from tree (feet)}} = \frac{\text{Scale interval (inches)}}{\text{Log height (feet)}}$$

The foregoing ratio is solved to determine the scale interval, and this distance is uniformly marked off on a straight rule to define the desired log height spacings. The Merritt hypsometer is a useful aid for estimating tree heights by log intervals, but it is not generally reliable for precise work.

Practice is needed to find both the 4½-foot point in relation to your height, and the 25-inch distance to your eye. When the stick is placed against a tree, close one eye, sight at the left or zero end. This and the tree bark should be in the same line. Now, DO NOT MOVE YOUR HEAD. Just move your eye across the stick, to the right hand edge of the tree. Read the tree diameter to the nearest inch. It is necessary to hold the stick at a right angle to the tree.

Height is measured as follows: pace out 66 feet from the base of the tree, to a point where the entire tree can be seen. Hold the stick so that the "Number of 16 foot logs" side faces you. The zero end should point toward the ground. Plumb the stick, at 25 inches from the eye. Sight the zero end to appear to rest on the stump. DO NOT MOVE YOUR HEAD. Run your eye up the stick to the point where the top of the last merchantable cut would be made in the tree. Remember to round down. Refer to examples on page 4, number 4.

Practice on pacing is needed to find the 66-foot point. The 25-inch distance from eye to stick is still the same as in measuring tree diameter.

Occasionally, a stand of young trees is so dense that the 66-foot distance is too far to clearly see the tree being measured. In this case, use a 25-foot distance from the tree and the 25-inch distance from eye to stick. Now, use the inch scale on the opposite edge of the stick (marked "Diameter of Log"). Sight with the zero at stump height and without moving your head, run your eye up the inch scale to

find the merchantable length. At this 25-foot distance, with the 25-inch eye to stick distance, 1 inch on the stick equals 1 foot on the tree. If arm reach is less than 25 inches, use the distance in feet equivalent to the arm reach to read the correct height on the inch scale.

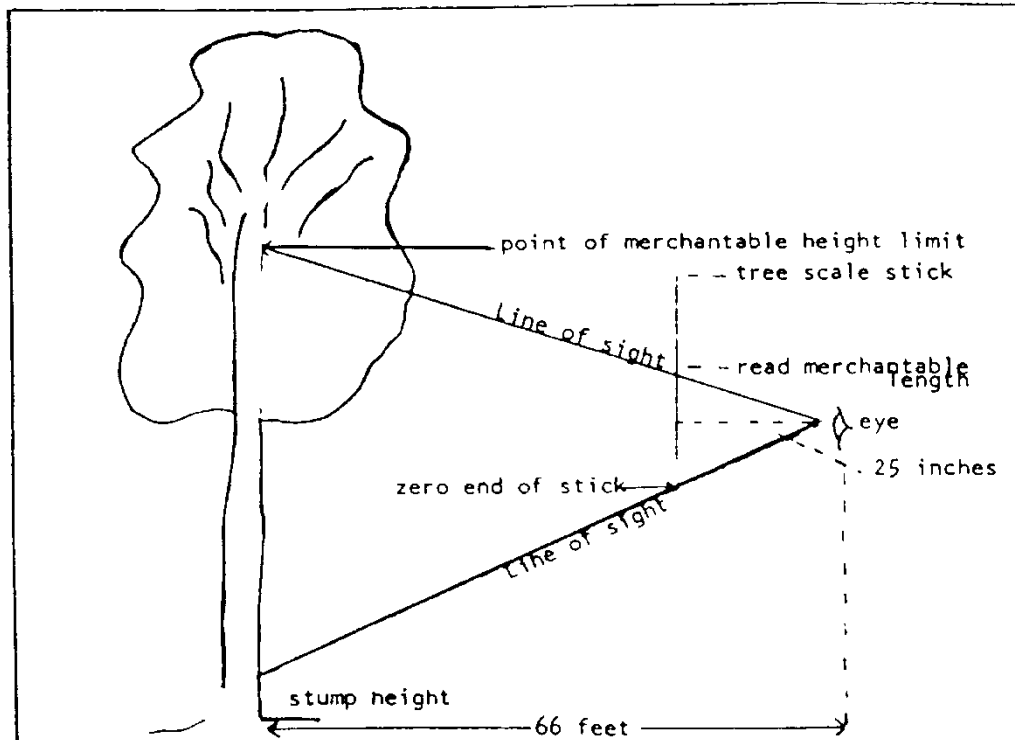


FIGURE 2: Method of using tree scale stick to obtain merchantable height. DO NOT MOVE HEAD, JUST EYE.

WEIGHT/VOLUME TABLES

These are a composite of actual values on an average basis for the product indicated. Once the tree measurement is determined, enter the appropriate weight/volume from the left with the tree diameter (D.B.H.). Move across the right to the column containing tree merchantable height at the top. At the intersection of these two points will be that tree's weight/volume. Sawlog trees will range from a minimum of 10 to a maximum of 30 inches D.B.H. The table shows the number of logs by half-log intervals from one to five logs. Read and record each tree volume directly and separately.

Use Table 1 (weight) for southern pine sawtimber only. Use Table II (MBF Doyle) for hardwood sawtimber only.

Table I
PREDICTED weight (lbs.) per tree by DBH and #16' logs (Southern Pine)

Note: Most timber products are now bought and sold on a per ton basis. This table will estimate the approximate weight of Southern pine in POUNDS. To convert to tons simply divide the total pounds by 2000. HOWEVER for CDE purposes ANSWERS WILL REMAIN IN POUNDS PER ACRE.

| DBH Pulpwood To a 4" top | 1 (16' logs) | 1.5 | 2 | 2.5 | 3 | 3.5 | 4 | 4.5 | |
|--|------------------------|------------|----------|------------|----------|------------|----------|------------|----------|
| 6 | 166 | 220 | 268 | 324 | 380 | 428 | | | |
| 7 | 216 | 286 | 350 | 414 | 466 | 558 | | | |
| 8 | 268 | 352 | 434 | 524 | 552 | 690 | 732 | | |
| 9 | 364 | 494 | 622 | 730 | 808 | 908 | 936 | | |
| DBH Sawtimber to an 8" top | 1 (16' logs) | 1.5 | 2 | 2.5 | 3 | 3.5 | 4 | 4.5 | 5 |
| 10 | 462 | 638 | 812 | 938 | 1064 | 1128 | 1142 | | |
| 11 | 556 | 770 | 980 | 1140 | 1298 | 1404 | 1480 | | |
| 12 | 654 | 904 | 1148 | 1344 | 1534 | 1680 | 1820 | | |
| 13 | 774 | 1074 | 1372 | 1606 | 1838 | 2016 | 2190 | | |
| 14 | 896 | 1246 | 1596 | 1870 | 2142 | 2352 | 2562 | 2772 | 2982 |
| 15 | 1028 | 1432 | 1834 | 2152 | 2474 | 2730 | 2982 | 3234 | 3486 |
| 16 | 1162 | 1618 | 2072 | 2436 | 2808 | 3108 | 3202 | 3696 | 3990 |
| 17 | 1322 | 1844 | 2356 | 2786 | 3210 | 3556 | 3898 | 4076 | 4396 |
| 18 | 1484 | 2072 | 2654 | 3136 | 3612 | 4004 | 4396 | 4458 | 4802 |
| 19 | 1656 | 2310 | 2964 | 3506 | 4042 | 4480 | 4920 | 5154 | 5530 |
| 20 | 1828 | 2548 | 3276 | 3878 | 4474 | 4956 | 5446 | 5852 | 6558 |
| 21 | 2016 | 2814 | 3616 | 4280 | 4942 | 5488 | 6038 | 6502 | 6964 |
| 22 | 2206 | 3080 | 3956 | 4684 | 5412 | 6020 | 6630 | 7154 | 7672 |
| 23 | 2436 | 3402 | 4356 | 5116 | 5984 | 6650 | 7308 | 7910 | 8508 |
| 24 | 2672 | 3724 | 4756 | 5670 | 6566 | 7280 | 7988 | 8667 | 9346 |
| 25 | 2946 | 4112 | 5236 | 6174 | 7100 | 7938 | 8712 | 9470 | 10214 |
| 26 | 3226 | 4502 | 5718 | 6678 | 7636 | 8596 | 9436 | 10276 | 11082 |
| 27 | 3562 | 5002 | 6296 | 7558 | 8308 | 9348 | 10264 | 11382 | 12060 |
| 28 | 3900 | 5442 | 6874 | 7840 | 8970 | 10100 | 11094 | 12090 | 13038 |
| 29 | 4231 | 5904 | 7458 | 8506 | 9732 | 10958 | 12037 | 13117 | 14146 |
| 30 | 4563 | 6367 | 8042 | 9172 | 10495 | 11817 | 12980 | 14145 | 15254 |

**TABLE II (Sawlogs)
DOYLE LOG RULE
FC - 78**

VOLUME (Board Feet) BY NUMBER OF 16 FOOT LOGS

| DBH Inches | 1 | 1 1/2 | 2 | 2 1/2 | 3 | 3 1/2 | 4 | 4 1/2 | 5 |
|---------------|-----|-------|-----|-------|-----|-------|------|-------|------|
| 10 | 14 | 17 | 20 | 21 | 22 | | | | |
| 11 | 22 | 27 | 32 | 35 | 38 | | | | |
| 12 | 29 | 36 | 43 | 48 | 53 | 54 | 56 | | |
| 13 | 38 | 48 | 59 | 66 | 73 | 76 | 80 | | |
| 14 | 48 | 62 | 75 | 84 | 93 | 98 | 103 | | |
| 15 | 60 | 78 | 96 | 108 | 121 | 128 | 136 | | |
| 16 | 72 | 94 | 116 | 132 | 149 | 160 | 170 | | |
| 17 | 86 | 113 | 140 | 161 | 182 | 196 | 209 | | |
| 18 | 100 | 132 | 164 | 190 | 215 | 232 | 248 | | |
| 19 | 118 | 156 | 194 | 225 | 256 | 276 | 297 | | |
| 20 | 135 | 180 | 225 | 261 | 297 | 322 | 346 | 364 | 383 |
| 21 | 151 | 207 | 260 | 302 | 344 | 374 | 404 | 428 | 452 |
| 22 | 174 | 234 | 295 | 344 | 392 | 427 | 462 | 492 | 521 |
| 23 | 195 | 264 | 332 | 388 | 444 | 483 | 522 | 558 | 594 |
| 24 | 216 | 293 | 370 | 433 | 496 | 539 | 582 | 625 | 668 |
| 25 | 241 | 328 | 414 | 486 | 558 | 609 | 660 | 709 | 758 |
| 26 | 266 | 362 | 459 | 539 | 619 | 678 | 737 | 793 | 849 |
| 27 | 292 | 398 | 505 | 594 | 684 | 749 | 814 | 877 | 940 |
| 28 | 317 | 434 | 551 | 650 | 750 | 820 | 890 | 961 | 1032 |
| 29 | 346 | 475 | 604 | 714 | 824 | 902 | 980 | 1061 | 1142 |
| 30 | 376 | 517 | 658 | 778 | 898 | 984 | 1069 | 1160 | 1251 |

SOURCE: United States Department of Agriculture Forest Service

Note: Volume Table II is for hardwood logs use only in the Alabama FFA CDE. If event judges select hardwood for the timber cruising phase of the event, this table will be used for calculations and scoring purposes instead of the southern pine weight table. If approximate tons per acre are desired, MBF Doyle volume per acre may be divided by 1,000 and then multiplied by 8.5 for a rough conversion to tons. However, for CDE purposes, volumes, including total volume answers, will remain in Board Feet Doyle scale for hardwood. Doyle rule only is used in the National Forestry CDE.

SCORE CHART FOR VOLUME OF SAWTIMBER

| Pounds per Acre | | |
|----------------------|---------------------|---------------------|
| <u>Percent Range</u> | <u>Volume Range</u> | <u>Volume Score</u> |
| 60 - 65%----- | _____ | ----- 5 pts. |
| 65 - 70%----- | _____ | ----- 10 pts. |
| 70 - 75%----- | _____ | ----- 15 pts. |
| 75 - 80%----- | _____ | ----- 20 pts. |
| 80 - 85%----- | _____ | ----- 25 pts. |
| 85 - 90%----- | _____ | ----- 30 pts. |
| 90 - 95%----- | _____ | ----- 35 pts. |
| 95-105%----- | _____ | ----- 40 pts. |
| 105-110%----- | _____ | ----- 35 pts. |
| 110-115%----- | _____ | ----- 30 pts. |
| 115-120%----- | _____ | ----- 25 pts. |
| 120-125%----- | _____ | ----- 20 pts. |
| 125-130%----- | _____ | ----- 15 pts. |
| 130-135%----- | _____ | ----- 10 pts. |
| 135-140%----- | _____ | ----- 5 pts. |

This chart is to be used only by official scorers.

Note: This card is for local/county usage only. Scantron will be used in district and state events. Since DBH and #16 foot logs (and not weight or volume of individual trees) are recorded on the scantron, participants must record weights or volume of each tree on a "scratch sheet of paper," then total the volumes of each tree, multiply by 5 (to expand 1/5 acre volume to full acre) and THEN record their full per acre weight or volume estimate on the scantron.

B. Sawtimber

| No. | DBH(3 pts.) | #16' Logs (3 pts.) | Bd.Ft. (0pts.) | Score |
|-----|-------------|--------------------|----------------|-------|
| 1. | | | | |
| 2. | | | | |
| 3. | | | | |
| 4. | | | | |
| 5. | | | | |
| 6. | | | | |
| 7. | | | | |
| 8. | | | | |
| 9. | | | | |
| 10. | | | | |

Bd. Ft. on 1/5 acre plot _____ **Crusing Score** _____

Bd. Ft. per Acre _____ **Volume Score** _____
 (Maximum Volume Score 40 Points)

TOTAL SAWTIMBER SCORE _____

Phase 3 -- TIMBER STAND IMPROVEMENT (TSI) AND/OR THINNING

1. A management objective must be in writing.
2. Twenty five (25) trees will be selected and designated for use in this portion of the event. All twenty five trees selected should be within a 1/5 acre plot (52'8" radius).
3. The 25 trees selected will represent a timber stand that needs either thinning or some TSI work. The participants will be given a "situation" concerning the forest management objectives of this imaginary stand. All trees, including unmarked trees, within the TSI area will be considered as part of the stand. Information that will help the participants with their decisions will include such things as wildlife habitat considerations, markets available, present condition of the stand, and the final goal of the management plan. Other information may be offered in order to help make the proper decisions.
4. Participants will have only 3 options for each of the 25 trees. The options will be:
 1. Harvest -- Utilize the tree.
 2. Leave -- This tree will remain in the stand for a good reason.
 3. Deaden -- (Undesirable tree, not merchantable or beneficial to wildlife, should be deadened or cut down and left in woods)
5. Four points will be allowed for each correct decision for a total of 100 points.
6. Participants will be given 20 minutes to make their decision in TSI.

TIMBER STAND IMPROVEMENT (TSI) AND/OR THINNING STUDY GUIDE

PURPOSE: Exercising proper judgment in removing poor quality trees from your timber stands at the opportune time is essential to the overall health, vigor, and value of your forests.

THINNING: You should thin (harvest) overstocked woods or those which are becoming crowded in order to give the remaining trees more space in which to grow in size and value.

METHOD

1. Determine which species of trees you want to harvest.

Trees will be marked for harvest if they are merchantable, will not help the landowner meet his objective(s), and are interfering with the growth of better trees. Trees that will not survive until the next cutting cycle should be harvested regardless of spacing unless they are useful for non-economic objectives. Minimum merchantable size is 5.0 inches DBH and twelve feet in height to a 4.0 inch top unless otherwise specified in the written "situation". Maximum merchantable size for particular product classifications is unlimited unless so specified. Large trees may be considered unmerchantable if they are hollow or decayed throughout the majority of the main stem. All species are considered merchantable for any and all product classifications unless otherwise specified in the written "situation".

2. Determine which species of trees you want to leave.

Trees will be marked leave, that are either considered "crop" trees that will remain in the stand until the final harvest or the next cutting cycle or will in some other way help the landowner achieve his management objective(s).

3. Determine which species of trees you want to deaden.

Trees should be deadened that are not merchantable, will not help achieve the management objective(s), and are interfering with the growth of better trees.

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 your management plans 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 cull trees and low quality species may be considered from the wildlife standpoint.

The participants will be given a situation concerning the forest management objectives of the stand selected. This information will be given to participants at the site before they start. Information that will be needed to help participants in their decisions will include:

- Markets available (ex: minimum dbh or merchantable heights, species requirements, pulpwood, tie-logs, saw-logs, etc.)
- Wildlife considerations (big-game, small game, quail, turkey, etc.)
- Present condition of the stand
- Management plan (ex: primary and secondary objectives)

Landowner management objectives for TSI

WRITTEN management objective shall include one of the following:

1. Landowner wants to manage on a selective sustained yield basis (no final clear-cut)

OR

2. Landowner wants to manage on an even aged basis (the stand will be clear-cut at some point in the future.

In either case the approximate age of the overstory shall be given. If the stand is to managed on an uneven aged basis then the approximate age the stand will be harvested (clearcut) shall be given

Example: This stand is approx. 20 years old and the landowners wants to clearcut and replant at age 35.

Management objective shall include a primary objective and any secondary objectives of the landowner (in order of importance) Secondary objectives are NOT necessarily required.

Possible landowner objectives could include,

1. Economic return
2. Wildlife (either in general or by species)
3. Aesthetics
4. Recreation (this could include hunting, hiking, camping, bird watching etc.)
5. Watershed protection: especially if all or part of the TSI area is within a perennial riparian (35 feet or less from the steambank)

Example: The landowner's primary objective is economic return from the production of timber. His secondary objective is wildlife, especially deer and turkey.

Minimum merchantability size should be included in the management objective. If not otherwise stated a minimum of 4.6 (5" diameter class) at DBH and at least 16' to a 3" top should be considered minimum for both pine and hardwood.

Maximum merchantability size: If economic return is an objective any pine that has reached a maximum desirable merchantability should be harvested. (22" DBH unless otherwise stated in the objectives.) No maximum merchantability for Hardwood unless stated in the objectives)

Oversize pines should only be left if tree in question happens to be growing directly on a perennial streambank.

Wildlife Trees

Keep in mind that trees left for wildlife need to be large enough to produce significant amounts of mast (seed) BEFORE the final harvest, (if there is to be one) (don't leave a 2 ft. oak if you plan to clear-cut and plant in 10 years)

Which tree species should be favored Depends on what type of wildlife the landowner has in mind (in the objectives)

For Deer consider the following (in order of preference)

White Oaks (including Post And Chestnut oak)
Red Oaks
Persimmon

**For Turkey consider the following:
(in order of preference)**

**White Oaks (including Post And Chestnut oak)
Red Oaks (especially Water oak)
Beech
Dogwood
Persimmon
Cherry
Mulberry
Blackgum**

If one of the objectives is wildlife in general (or specific cavity nesters such as squirrel, raccoon and wood duck) is an objective consider leaving trees with hollows or cavities. Sweetgum may be considered a wildlife tree if the objective is wildlife in general or quail specifically. Hickory also may be considered for wildlife in general or for squirrel specifically.

If the TSI area or a part of it is within 35 feet of a live stream the SMZ guidelines must be considered. Only 50% of the overstory may be removed from the SMZ area. NO TREES that are actually on the stream bank or in the stream channel are to be removed. Oftentimes harvesting inside an SMZ in a mixed stand involves harvesting the mature pine and leaving the hardwood

Phase 4 -- TREE IDENTIFICATION

1. Participants will be required to identify 20 species from those listed. The same species may be used more than once on the same event. Participants will be judged on the accuracy of identification.

The Tree Identification Score Card has been revised. The front is shown on page 18 and back on page 19. Participants will simply write the number representing the tree species as listed on the back of the card. Participants will no longer be required to spell the name of the tree.

2. Five points will be given for each correct answer.

SPECIES

| | | |
|------------------------|------------------------|----------------------|
| 01 Allegheny Chinkapin | 26 Eastern Cottonwood | 51 Pondcypress |
| 02 American Beech | 27 Eastern Hemlock | 52 Post Oak |
| 03 American Holly | 28 Eastern Hophornbeam | 53 Red Maple |
| 04 American Hornbeam | 29 Eastern Redbud | 54 Red Mulberry |
| 05 American Sycamore | 30 Eastern Redcedar | 55 River Birch |
| 06 Ash | 31 Eastern White Pine | 56 Sassafras |
| 07 Baldcypress | 32 Elm | 57 Sawtooth Oak |
| 08 Basswood | 33 Flowering Dogwood | 58 Scarlet Oak |
| 09 Black Birch | 34 Hackberry | 59 Shortleaf Pine |
| 10 Black Cherry | 35 Hazel Alder | 60 Silver Maple |
| 11 Blackgum | 36 Hickory | 61 Slash Pine |
| 12 Blackjack Oak | 37 Honey Locust | 62 Sourwood |
| 13 Bluejack Oak | 38 Laurel Oak | 63 Southern Catalpa |
| 14 Black Locust | 39 Leyland Cypress | 64 Southern Magnolia |
| 15 Black Oak | 40 Live Oak | 65 Southern Red Oak |
| 16 Black Walnut | 41 Loblolly Pine | 66 Spruce Pine |
| 17 Black Willow | 42 Longleaf Pine | 67 Sugar Maple |
| 18 Boxelder | 43 Mimosa | 68 Sumac |
| 19 Buckeye (sp) | 44 Northern Red Oak | 69 Sweetbay |
| 20 Cherrybark Oak | 45 Osage-orange | 70 Sweetgum |
| 21 Chestnut Oak | 46 Overcup Oak | 71 Turkey Oak |
| 22 Chinaberry | 47 Paulownia | 72 Virginia Pine |
| 23 Chinese Privet | 48 Pecan | 73 Water Oak |
| 24 Common Persimmon | 49 Pitch Pine | 74 White Oak |
| 25 Cucumber Tree | 50 Pond Pine | 75 Willow Oak |
| | | 76 Yaupon |
| | | 77 Yellow-poplar |

NOTE: Only these trees will be considered. The study guide for the Tree Identification phase is 100 Forest Trees of Alabama. Some species may not appear in the 100 Forest Trees of Alabama study material.

Front of Tree Identification Score Card

ALABAMA FFA FORESTRY CAREER DEVELOPMENT EVENT SCORE CARD

Participant's Name _____

Participant's No. _____

School _____

TREE IDENTIFICATION (Maximum Score 100 Points)

| Specimen Number | Number From Back of Card | Specimen Number | Number From Back of Card |
|-----------------|--------------------------|-----------------|--------------------------|
| 1 | _____ | 11 | _____ |
| 2 | _____ | 12 | _____ |
| 3 | _____ | 13 | _____ |
| 4 | _____ | 14 | _____ |
| 5 | _____ | 15 | _____ |
| 6 | _____ | 16 | _____ |
| 7 | _____ | 17 | _____ |
| 8 | _____ | 18 | _____ |
| 9 | _____ | 19 | _____ |
| 10 | _____ | 20 | _____ |

Score

Note: This card is for local/county usage only. Scantron card will be used in district/state events.

Back of Tree Identification Score Card

Enter the number in front of the tree species
below in the appropriate space on the front of
this card.

| | | |
|---|--|---|
| <p>01 Allegheny Chinkapin 02 American Beech 03 American Holly 04 American Hornbeam 05 American Sycamore 06 Ash 07 Baldcypress 08 Basswood 09 Black Birch 10 Black Cherry 11 Blackgum 12 Blackjack Oak 13 Bluejack Oak 14 Black Locust 15 Black Oak 16 Black Walnut 17 Black Willow 18 Boxelder 19 Buckeye (sp) 20 Cherrybark Oak 21 Chestnut Oak 22 Chinaberry 23 Chinese Privet 24 Common Persimmon 25 Cucumber Tree</p> | <p>26 Eastern Cottonwood 27 Eastern Hemlock 28 Eastern Hophornbeam 29 Eastern Redbud 30 Eastern Redcedar 31 Eastern White Pine 32 Elm 33 Flowering Dogwood 34 Hackberry 35 Hazel Alder 36 Hickory 37 Honey Locust 38 Laurel Oak 39 Leyland Cypress 40 Live Oak 41 Loblolly Pine 42 Longleaf Pine 43 Mimosa 44 Northern Red Oak 45 Osage-orange 46 Overcup Oak 47 Paulownia 48 Pecan 49 Pitch Pine 50 Pond Pine</p> | <p>51 Pondcypress 52 Post Oak 53 Red Maple 54 Red Mulberry 55 River Birch 56 Sassafras 57 Sawtooth Oak 58 Scarlet Oak 59 Shortleaf Pine 60 Silver Maple 61 Slash Pine 62 Sourwood 63 Southern Catalpa 64 Southern Magnolia 65 Southern Red Oak 66 Spruce Pine 67 Sugar Maple 68 Sumac 69 Sweetbay 70 Sweetgum 71 Turkey Oak 72 Virginia Pine 73 Water Oak 74 White Oak 75 Willow Oak 76 Yaupon 77 Yellow-poplar</p> |
|---|--|---|

Note: Tree list will be provided in all Alabama events. Participants will record species by number from the list.

Phase 5 -- COMPASS COURSE

1. The compass course is a part of the event at the county, district, and state levels.
2. **Course Setup**

The tools needed for setting up the compass course are: one accurate hand compass, staff compass; one steel tape; and a minimum of six wooden stakes of sufficient length to leave two to three feet above the ground.

Mark 6 points, using a stake at each point. (It is suggested that stakes be either painted orange or wrapped with orange flagging.) There should be a minimum of five degrees difference in direction and 50 feet distance between each point. The entire course should not be over 600 feet.

Points and direction should be designated A (start), B, C, D, E, and F (end). Distances should be designated as A-B, B-C, C-D, D-E, and E-F.

Points (stakes) should be clearly visible. Each point should be clearly labeled as A, B, C, D, E, and F (perhaps using paper plates stapled to each stake).

3. **Operation of Course**

Event officials must keep in mind that each group has only twenty minutes to complete the course.

It is suggested that if the number of teams represented is expected to exceed six, then one or more parallel courses should be set up. This will permit more than one participant in each group to work on the same point at the same time. (It would not be necessary to separate these parallel courses by more than three to four feet.)

Each participant will take an azimuth reading at each of the first five points, using any type hand compass. If using a quadrant compass, the reading must be converted to azimuth. Compasses designed to be mounted on a tripod or staff should not be allowed. "Digital" and/or "electronic" compasses are NOT ALLOWED.

Each team member will need to bring a hand compass with declination set at zero. (Note: Each team member should have their team name on their compass.)

After each direction is recorded, the participant will pace the following distance and record it to the nearest foot. Standard pocket Calculators may be used to convert paces to feet. *True North should be recorded as 0 degrees, not 360.*

Participants MAY NOT support their compass on any stake or other object. Participants MAY NOT touch or move the stakes in any way.

Participants will determine each distance by pacing (that is by using a natural walking gait) NO HEEL-TOE, HEEL-TOE measurements will be allowed.

4. Scoring

Each participant will be awarded 100 points for the compass course phase at the beginning of the event. Ten (10) points will be awarded for each compass reading and ten (10) points for each correct distance. For each two degree error, one point will be deducted. For each 2-foot error, one point will be deducted. For each direction or each distance that is omitted, ten (10) points will be deducted. No more than 10 points will be deducted for each direction or distance.

ALABAMA FFA FORESTRY CAREER DEVELOPMENT EVENT SCORE CARD

**COMPASS COURSE
SCORE CARD**
Maximum Score
100 points

Participant's Name _____

Participant's No. _____

School _____

| POINT | DIRECTION (bearing or azimuth) | ERROR | POINT DEDUCTION (1 point for each 2-degree error) Maximum 10 pts. | LINE | DISTANCE (to nearest foot) | ERROR | POINT DEDUCTION (1 point for each 2-foot error) Maximum 10 pts. |
|-------|-----------------------------------|---------------|---|------|-------------------------------|---------------|---|
| A | | | | A-B | | | |
| B | | | | B-C | | | |
| C | | | | C-D | | | |
| D | | | | D-E | | | |
| E | | | | E-F | | | |
| | | TOTALS | | | | TOTALS | |

TOTAL POINTS DEDUCTED: _____

COMPASS COURSE SCORE _____

This card is for local/county usage only. Scantron will be used in the district/state events.

Equipment Identification: State Contest Only

This is an individual event to be conducted in conjunction with the Written Exam. (30 minute time limit for Equipment ID and 30 minute time limit for written exam)

Twenty (20) pieces of equipment (or slides/photos or a combination) from the following list will be displayed for participants to identify by technical names. Each piece of equipment will be designated by number. Time: Each participant will be allowed 30 minutes to complete this phase. Scoring: Three points will be given for each piece of equipment identified correctly for a total of 60 points. All answers must be correct. No partial credit will be given.

- | | |
|---|-------------------------------------|
| 53. <u>Altimeter</u> | 81. <u>pH Meter</u> |
| 54. <u>Back-Pack Fire Pump</u> | 82. <u>Planimeter</u> |
| 55. <u>Bark Gauge</u> | 83. <u>Plant Press</u> |
| 56. <u>Bulldozer</u> | 84. <u>Plastic Flagging</u> |
| 57. <u>Canthook</u> | 85. <u>Pulaski Forester Axe</u> |
| 58. <u>Chainsaw</u> | 86. <u>Relaskop</u> |
| 59. <u>Chainsaw Chaps</u> | 87. <u>Safety Glasses</u> |
| 60. <u>Clinometer</u> | 88. <u>Safety Hard Hat</u> |
| 61. <u>Data Recorder</u> | 89. <u>Soil Sampler</u> |
| 62. <u>Densiometer</u> | 90. <u>Soil Test Kit</u> |
| 63. <u>Diameter Tape</u> | 91. <u>Staff Compass</u> |
| 64. <u>Dot Grid</u> | 92. <u>Stereoscope</u> |
| 65. <u>Drip Torch</u> | 93. <u>Survey Instrument</u> |
| 66. <u>Endloader</u> | 94. <u>Tally Book</u> |
| 67. <u>Feller Buncher</u> | 95. <u>Tally Meter</u> |
| 68. <u>Fiberglass Measuring Tape</u> | 96. <u>Tree Caliper</u> |
| 69. <u>Fire Rake</u> | 97. <u>Tree Harvester</u> |
| 70. <u>Fire Weather Kit</u> | 98. <u>Tree Marking Gun</u> |
| 71. <u>Fire-Swatter</u> | 99. <u>Tree Planting Hoe or Bar</u> |
| 72. <u>Flow/Current Meter</u> | 00. <u>Tree Skidder</u> |
| 73. <u>GPS Receiver</u> | 01. <u>Tree Stick</u> |
| 74. <u>Hand Compass</u> | 02. <u>Water Sampler</u> |
| 75. <u>Hand Lens/Field Microscope</u> | 03. <u>Water Test Kit</u> |
| 76. <u>Hip Chain</u> | 04. <u>Wedge Prism</u> |
| 77. <u>Hypo-Hatchet</u> | 05. <u>Wheeler Caliper</u> |
| 78. <u>Increment Borer</u> | |
| 79. <u>Log Rule</u> | |
| 80. <u>Logger's Tape</u> | |

Alabama FFA Forestry Career Development Event Scorecard

Participant's Name _____

Participant's number _____

School _____

Equipment Identification (maximum 60 points)

| Specimen Number | Number from Equip. List | Specimen Number | Number from Equip. List |
|-----------------|-------------------------|-----------------|-------------------------|
|-----------------|-------------------------|-----------------|-------------------------|

- | | | | |
|-----|-------|-----|-------|
| 1. | _____ | 11. | _____ |
| 2. | _____ | 12. | _____ |
| 3. | _____ | 13. | _____ |
| 4. | _____ | 14. | _____ |
| 5. | _____ | 15. | _____ |
| 6. | _____ | 16. | _____ |
| 7. | _____ | 17. | _____ |
| 8. | _____ | 18. | _____ |
| 9. | _____ | 19. | _____ |
| 10. | _____ | 20. | _____ |

TOTAL SCORE:

This card is for local/county usage. Scantron card will be used in district/state events.

TEAM ACTIVITY: MAP INTERPRETATION (Odd number years)

This team activity will be conducted at the State level only. All teams will be required to participate.

1. Participants will be furnished a *United States Geological Survey topographic map* with specific points marked to be identified. The participant shall know legal description, recognize topographic map symbols, understand the meaning of map symbols and size and location of 20 acres or more in a section.
2. Ten points on a map will be clearly marked with a number or arrow pointing to the section, symbol, or area on the map to be identified.

Examples:

- (1)What is the legal description of the area boxed?
 - (2)What is the item located a this point?
 - (3)What is the acreage of the area enclosed?
 - (4)In what section is the city of Marshall located?
3. Legal descriptions will be written or described according to the following:

NW Northwest
T Township
SE Southeast
R Range
S Section (640 acres)
¼ Quarter of section (160 acres)
 4. **SCORING:** Ten questions or problems will be completed. The ten questions or problems will be multiple-choice with four (4) possible answers. Ten points will be awarded for each correct answer.

REFERENCES:

The U.S. Department of Interior Geological Survey Topographic Map information and Symbols Key. Available from: Map Distribution, U. S. Geological Survey, Box 25286, Federal Center, Denver, CO 80223.

- *How to teach with Topographic Map (\$12.95)
- *Your Way with Map and Compass Orienteering (\$8.95)
- *Be Expert with Map and Compass (\$17.25)

*All Available through "Ben Meadows Co." or "Forestry Suppliers"

TEAM ACTIVITY: Tree Disorders (Even number years)

Tree/Forest Disorders Practicum

- a. Symptoms of at least ten (10) and not more than twenty (20) disorders from the list at the end of this chapter will be displayed for participants to identify by common names. The symptoms will be presented in one or more of the following forms:
- i. Actual sample
 - ii. Pictures/slides
 - iii. Written description
 - iv. Written case history
- b. A number will designate each set of symptoms representing a disorder.
- c. Scoring: A total of 100 points are possible for this practicum.

Tree Disorders Identification List

INSECTS:

- 106. Ambrosia Beetle
- 107. Aphid
- 108. Bagworm
- 109. Black Turpentine Beetle
- 110. Conifer Sawflies
- 111. Cicada
- 112. Eastern Tent Caterpillar
- 113. Fall Webworm
- 114. Gypsy Moth
- 115. Hemlock Woolly Adelgid
- 116. Insect Gall
- 117. Ips Engraver Beetle
- 118. Locust Borer
- 119. Nantucket Pine Tip Moth
- 120. Pales Weevil
- 121. Pine Sawfly
- 122. Pine Webworm
- 123. Scales
- 124. Southern Pine Beetle
- 125. Southern Pine Sawyer

DISEASES:

- 126. Annosum Root Disease
- 127. Black Knot
- 128. Brown Spot Needle Blight
- 129. Cedar Apple Rust
- 130. Fusiform Rust
- 131. Hypoxylon Canker
- 132. Littleleaf Disease
- 133. Needle Casts
- 134. Nectria Canker
- 135. Pine Needle Rust
- 136. Pitch Canker
- 137. Slime Flux
- 138. Sooty Mold
- 139. Witches Broom

OTHER DISORDERS:

- 140. Fire Damage
- 141. Mechanical Damage
- 142. Mistletoe
- 143. Sunscald
- 144. Wildlife/Livestock Damage

HAZARDS OF THE FOREST:

- 145. Black Widow Spider
- 146. Brown Recluse Spider
- 147. Fire Ants
- 148. Poison Ivy/Oak
- 149. Saddleback Caterpillar
- 150. Scorpion
- 151. Tick
- 152. Wasps

INVASIVE SPECIES:

- 153. Autumn Olive
- 154. Chinaberry
- 155. Chinese Privet
- 156. Chinese Tallow Tree
- 157. Cogongrass
- 158. Japanese Climbing Fern
- 159. Kudzu
- 160. Mimosa
- 161. Paulownia
- 162. Tree of Heaven
- 163. Wisteria

**FORESTRY
 CAREER DEVELOPMENT EVENT**

CHAPTER _____

| Participant | Participant Number | Event Phase | Participant Score | Participant Total |
|-------------------------|---|--|-------------------|-------------------|
| Name of Participant # 1 | Written Exam | (100 points) | | |
| | Timber Cruising/Estimating Sawtimber (Score:) | (Max. 100 points.) | | |
| | Timberstand Improvement (TSI) | (100 pts.) | | |
| | Tree Identification | (100 points.) | | |
| | Compass Course | (100 points.) | | |
| | Participant # 1's Total | | | |
| Name of Participant # 2 | Written Exam | (100 points) | | |
| | Timber Cruising/Estimating Sawtimber (Score:) | (Max. 100 points.) | | |
| | Timberstand Improvement (TSI) | (100 pts.) | | |
| | Tree Identification | (100 points.) | | |
| | Compass Course | (100 points.) | | |
| | Participant # 2's Total | | | |
| Name of Participant # 3 | Written Exam | (100 points) | | |
| | Timber Cruising/Estimating Sawtimber (Score:) | (Max. 100 points.) | | |
| | Timberstand Improvement (TSI) | (100 pts.) | | |
| | Tree Identification | (100 points.) | | |
| | Compass Course | (100 points.) | | |
| | Participant # 3's Total | | | |
| Name of Participant # 4 | Written Exam | (100 points) | | |
| | Timber Cruising/Estimating Sawtimber (Score:) | (Max. 100 points.) | | |
| | Timberstand Improvement (TSI) | (100 pts.) | | |
| | Tree Identification | (100 points.) | | |
| | Compass Course | (100 points.) | | |
| | Participant # 4's Total | | | |
| TEAM RANKING | | TOTAL TEAM SCORE (The three highest individual participant scores will make up the team score. Maximum score possible is 1500 points.) | | |

**FORESTRY
CAREER DEVELOPMENT EVENT**

CHAPTER _____

| Participant | Participant Number | Event Phase | Participant Score | Participant Total |
|---|--|---------------------------------|-------------------|-------------------|
| Name of Participant # 1 | Written Exam | (100 points) | | |
| | Timber Cruising/Estimating Sawtimber | (Max. 100 points.) (Score:) | | |
| | Timberstand Improvement (TSI) | (100 pts.) | | |
| | Tree Identification | (100 points.) | | |
| | Compass Course | (100 points.) | | |
| | Equipment Identification | (60 points) | | |
| | Participant # 1's Total | | | |
| Name of Participant # 2 | Written Exam | (100 points) | | |
| | Timber Cruising/Estimating Sawtimber | (Max. 100 points.) (Score:) | | |
| | Timberstand Improvement (TSI) | (100 pts.) | | |
| | Tree Identification | (100 points.) | | |
| | Compass Course | (100 points.) | | |
| | Equipment Identification | (60 points) | | |
| | Participant # 2's Total | | | |
| Name of Participant # 3 | Written Exam | (100 points) | | |
| | Timber Cruising/Estimating Sawtimber | (Max. 100 points.) (Score:) | | |
| | Timberstand Improvement (TSI) | (100 pts.) | | |
| | Tree Identification | (100 points.) | | |
| | Compass Course | (100 points.) | | |
| | Equipment Identification | (60 points) | | |
| | Participant # 3's Total | | | |
| Name of Participant # 4 | Written Exam | (100 points) | | |
| | Timber Cruising/Estimating Sawtimber | (Max. 100 points.) (Score:) | | |
| | Timberstand Improvement (TSI) | (100 pts.) | | |
| | Tree Identification | (100 points.) | | |
| | Compass Course | (100 points.) | | |
| | Equipment Identification | (60 points) | | |
| | Participant # 4's Total | | | |
| TEAM ACTIVITY: Map Interpretation (100 points) | | | | |
| TEAM RANKING | TOTAL TEAM SCORE | | | |
| | (The three highest individual participant scores plus the team activity score will make up the team score. Maximum score possible is 1780 points.) | | | |

SUGGESTED SCHEDULE

| Team Activity - 20 minutes | | | | |
|-----------------------------------|------------------------|------------------------|------------------------|------------------------|
| | Group 1 | Group 2 | Group 3 | Group 4 |
| Time Period A | Timber Measurements | Tree ID | TSI | Compass Course |
| B | Calculations | Timber Measurements | Compass Course | TSI |
| C | Compass Course | Calculations | Timber Measurements | Tree ID |
| D | Tree ID | TSI | Calculations | Timber Measurements |
| E | TSI | Compass Course | Tree ID | Calculations |

Note: Time Periods are twenty minutes each.