



# Forestry

## Purpose

*The Tennessee FFA Forestry Career Development Event is designed to stimulate student interest and to promote the forestry industry as a career choice. It also provides recognition for those who have demonstrated skills and competencies resulting from forestry instruction in the agricultural education classroom.*

## Objectives

Students will be able to

- Understand and use forestry terms.
- Promote an understanding of the economic impact of the forest environment and the forest industry to the American economy.
- Recognize sustainability (multiple use) opportunities in the forests.
- Recognize environmental and social factors affecting the management of forests.
- Identify major species of trees of economic importance to the United States and internationally.
- Identify and properly use hand tools and equipment in forestry management.
- Recognize and understand approved silvicultural practices in the United States.
- Identify forest disorders.
- Take a forest inventory.
- Utilize marketing management strategies.
- Recognize safety practices in forest management.

## Event Rules

- The team will consist of four individuals, and all four scores will count toward the team score.
- The team score is comprised of the combined scores of each individual and the team activity in which all team members will participate.
- Participants must come to the event prepared to work in adverse weather conditions. The event will be conducted regardless of weather. Participants should have rain gear, warm clothes and closed toed shoes. Each participant must provide the following safety equipment, and it must be worn while in the woods or the participant will be disqualified:
- Students are required to bring their own pencils.
- Participants should provide the following: clean clipboard, compass, tree stick, calculator, pencils, and/or clinometer.
- Participants must follow instructions from event staff for handling materials during the event. Any infraction of this rule will be sufficient to eliminate the team from the event.
- Observers will not be permitted in the event area while the event is in progress.
- Participants will be assigned to group leaders who will escort them to various event-staging sites. Each participant is to stay with his or her assigned group leader throughout the event or until told to change leaders by the event superintendent.
- All participants will be given an identification number by which they will be designated throughout the event.
- All written materials will be furnished for the event. No written materials such as tests, problems

and worksheets shall be removed from the event site.

- Any participant in possession of an electronic device in the event area is subject to disqualification.

## Event Format

### INDIVIDUAL ACTIVITIES

#### *Written Exam (100 points)*

- Fifty multiple-choice questions will be selected from areas of the forestry industry reflected in the event objectives. This phase of the event will test the participant's knowledge and understanding of basic principles of forestry. The test will be comprised of questions from the last five years of National FFA forestry exams.
- Each participant will be allowed 45 minutes to complete this phase of the event.

#### *Tree Identification (100 points)*

- Twenty live specimens, pressed samples, fresh leaf samples and/or standing trees, from the tree identification specimen list will be displayed for participants to identify by common names. A number will designate each specimen.
- Each participant will be allowed 30 minutes to complete this phase.

#### *Tree Measurement — Timber Cruising for Board Volume (100 points)*

- Each participant will measure ten pre-numbered trees on a plot for board foot volume. The participant must record the DBH (Diameter Breast Height) to the nearest one-inch class and the merchantable height of each tree height rounded down to the nearest ½ log.
- Volume tables will be provided at the event.
- The following minimum diameters and log length will be:

| Minimum Saw Timber |               |
|--------------------|---------------|
| DBH                | 10 inches     |
| Top diameter       | 10 inches DIB |
| Height             | 16 feet       |

- Merchantable height stops are estimated to the upper point on a tree where it becomes 10 inches in diameter or where a major fork in a tree stem occurs or where a limb has a diameter equal to ½ of the diameter of the tree at that point.
- Each participant will be allowed 30 minutes to complete this phase.
- Thirty points will be given for the correct DBH and thirty points for the correct height. Forty points will be given for the correct volume per acre. Five points will be deducted for each five percent deviation (plus or minus) from the correct measured volume.
- Members can use a tree stick and/or clinometer to complete this activity.

### *Individual Practicums (100 points) each for total of 500 points per individual*

Participants will compete individually in two practicums from the following list:

- Equipment identification.
- Map interpretation.
- Compass.
- Chainsaw part identification, troubleshooting and safety.
- Tree/Forest disorder.
  - Each participant will have 30 minutes to complete each practicum.

#### **EQUIPMENT IDENTIFICATION PRACTICUM**

- Twenty-five pieces of equipment from the equipment identification list will be displayed for participants to identify by technical names. Each piece of equipment will be designated by number.
- The equipment will be presented in one or more of the following forms:
  - Actual samples.
  - Pictures or slides.
  - Written description.

#### **MAP INTERPRETATION PRACTICUM**

Participants will answer questions using a furnished United States Geological Survey topographic map. The participant should know legal description, recognize topographic map symbols, and understand the meaning of map symbols, size and location of 40 acres or more in a parcel.

##### **Examples:**

- What is the legal description of the boxed area?
- What is the item located at this point?
- What is the acreage of the area enclosed?
- In what section is the city of Marshall located?
- What is the elevation at this point?

Legal descriptions will be written or described according to the public land survey system.

- **Example:** SE  $\frac{1}{4}$  of NW  $\frac{1}{4}$  of Section 3, T3N, R1E

#### **COMPASS PRACTICUM**

The participant will use a hand compass and pacing to the nearest full foot to simulate the determination of the property lines on a tract of timber. The participant will start at any point and record the compass reading and distance to the next point. Azimuth readings shall be recorded. Participants will record data for 10 points.

Partial credit will be given with a deduction of one point for each two degrees or two feet the participant is off the correct answer.

#### **CHAINSAW PART IDENTIFICATION, TROUBLESHOOTING AND SAFETY PRACTICUM**

This practicum will consist of one or more of the parts listed below. Parts may utilize photos, video, demonstration, actual parts, written situations and/or problems. This is not an all-inclusive list.

- **Chainsaw parts identification:** Each participant will identify parts of a chainsaw (does not include internal engine components).
- **Troubleshooting:** The participant will identify chainsaw problems or troubles.
- **Safety:** The participant will identify safety hazards, unsafe practices and/or proper safety equipment.

**TREE/FOREST DISORDERS PRACTICUM**

Symptoms of at least 10, but not more than 20, disorders from the Tree Disorders Identification List will be displayed for participants to identify by common names. The symptoms will be presented in one or more of the following forms:

- Actual sample.
- Pictures/slides.
- Written description.
- Written case history.

A number will designate each set of symptoms representing a disorder.

**TEAM ACTIVITIES**

*Forest Industry Scenario Team Activity (450 points)*

Each team will be provided with a forest industry scenario. The scenario will utilize components from the individual forestry CDE practicums. Teams must work together using forestry skills and tools to complete the team activity. Ninety minutes will be allowed to plan and complete the activity. All supplies and materials needed to complete the task will be provided.

Example(s) 10 questions for 100 points..

1. Station 1
  - a. Identify this tree (2 pts) \_\_\_\_\_
  - b. What is the diameter of this tree? (2pts) \_\_\_\_\_
  - c. What is the merchantable height? (2pts) \_\_\_\_\_
  - d. What is the board foot volume? (2 pts) \_\_\_\_\_
  - e. What is the merchantable board foot value of this tree? (2 pts) \_\_\_\_\_

| Species       | Price per bd ft |
|---------------|-----------------|
| Yellow Poplar | \$0.30          |
| White Oak     | \$0.70          |
| Red Oak       | \$0.50          |
| Walnut        | \$0.90          |

2. Station 2
  - a. Identify this piece of equipment flagged E1 (5 pts) \_\_\_\_\_
  - b. Identify the piece of equipment flagged E2 (5 pts) \_\_\_\_\_
3. Station 3
  - a. Identify this tree (5 pts) \_\_\_\_\_
  - b. What is the diameter of this tree (5 pts) \_\_\_\_\_
4. Station 4. Refer to the line marked by two stakes.
  - a. Along what azimuth does the marked boundary line extend?
  - b. How many feet is this leg of the boundary?
5. Use the provided USGS topography map to answer the following questions:
  - a. What is the scale of this USGS topography map?
  - b. What is the contour interval of the USGS topography map?
6. Station 6
  - a. Identify this tree.
  - b. What disorder does the tree possess?

## Scoring

| Activities   | Individual Points | Team Points |
|--|-------------------|-------------|
| General knowledge exam                                   | 100               | 400         |
| Tree identification                                      | 100               | 400         |
| Tree measurements — timber cruising                      | 100               | 400         |
| Equipment Identification                                 | 100               | 400         |
| Map Interpretation                                       | 100               | 400         |
| Compass  | 100               | 400         |
| Tree/Forest Disorders & Insects                          | 100               | 400         |
| Chainsaw Part Identification, troubleshooting and Safety | 100               | 400         |
| Forest industry scenario team activity                   |                   | 100         |
| <b>TOTAL</b>   | 800               | 3,300       |

### TIEBREAKERS

#### Team

Tiebreakers for teams will be determined by adding together the individual ranking of team members. The team with the lowest score will earn the tiebreak.

#### Individuals

1. Timber cruising
2. Tree identification
3. Total Individual Practicum Score
4. Knowledge exam

## References

*This list of references is not intended to be all-inclusive.* Other sources may be utilized, and teachers are encouraged to make use of the very best instructional materials available. Use discretion when selecting website references by only using reputable, proven sites. The following list contains references that may prove helpful during event preparation. The most current edition of resources will be used. Past CDE materials and other resources are available by navigating to [FFA.org](https://www.ffa.org).

### GENERAL KNOWLEDGE EXAM

- Introduction to Forestry Science. Burton, Delmar Publications.
- Science of Forestry Management. Kris Irwin. University of Georgia, AAVIM. Please call 706-742-5355

or email [sales@aavim.com](mailto:sales@aavim.com). Request Item #400. Cost is ~ \$25 plus \$10.50 shipping. Please leave your name, Item, number of copies, shipping and billing address, and phone number. They will respond to secure payment information.

### TREE IDENTIFICATION

- Dendrology at Virginia Tech, <http://dendro.cnre.vt.edu/dendrology/main.htm>
- “FFA Georgia State and National Tree Lists,” available from [www.amazon.com](http://www.amazon.com)
- W. H. Harlow, E. S. Harrar, and F. M. White. Textbook of Dendrology, current edition. New York, NY: McGraw-Hill Book Company.
- Silvics of North America, Handbook #654, volume one and two, U.S. Forest Service, P. O. Box 2417, 12th and Independence Avenue SW, Washington, DC 20013.

### TREE MEASUREMENT

- [https://www.americanforests.org/wp-content/uploads/2014/12/AF-Tree-Measuring-Guidelines\\_LR.pdf](https://www.americanforests.org/wp-content/uploads/2014/12/AF-Tree-Measuring-Guidelines_LR.pdf)

### FOREST MANAGEMENT

- Introduction to Forestry Science. Burton, Delmar Publications.
- Science of Forestry Management. Kris Irwin. University of Georgia, AAVIM. . Please call 706-742-5355 or email [sales@aavim.com](mailto:sales@aavim.com). Request Item #400. Cost is ~ \$25 plus \$10.50 shipping. Please leave your name, Item, number of copies, shipping and billing address, and phone number. They will respond to secure payment information.

### EQUIPMENT IDENTIFICATION

- Current Catalog of Forestry Suppliers, Inc., 205 West Rankin Street, Jackson, MS 39204-039.
- <http://www.husqvarna.com/us/accessories/>
- [www.deere.com/en\\_US/industry/forestry/forestry.page?](http://www.deere.com/en_US/industry/forestry/forestry.page?)
- [www.treestuff.com](http://www.treestuff.com)

### MAP INTERPRETATION

- The U.S. Department of Interior Geological Survey Topographic Map Information and Symbols Key, Map Distribution, U. S. Geological Survey, Box 25286, Federal Center, Denver CO.  
<https://pubs.usgs.gov/gip/TopographicMapSymbols/topomapsymbols.pdf>
- Map Interpretation: <https://www.norfolk.gov.uk/-/media/norfolk/downloads/jobs-training-volunteering/volunteering/map-reading-guide.pdf>  
Map Interpretation: [https://d28rz98at9flks.cloudfront.net/102240/Map\\_reading\\_guide\\_v4.pdf](https://d28rz98at9flks.cloudfront.net/102240/Map_reading_guide_v4.pdf)
- Reading and Interpreting Topographic Maps: paste the following url into your browser  
[ftp://ftp.bpcrc.osu.edu/downloads/outreach/Watersheds/01\\_Exercise3.5v1.pdf](ftp://ftp.bpcrc.osu.edu/downloads/outreach/Watersheds/01_Exercise3.5v1.pdf)

### COMPASS

[https://georgia4h.org/wp-content/uploads/2018/05/manual\\_compassranger.pdf](https://georgia4h.org/wp-content/uploads/2018/05/manual_compassranger.pdf)

### CHAINSAW PARTS AND IDENTIFICATION

Husqvarna How to and safety training videos, Training videos include stance, safety gear, maintenance and how to execute a tree felling plan. <https://www.youtube.com/playlist?list=PL0VcazyXHqErUd8ib-OKs6sZkfGFO5shu>

# Tree Identification Specimen List

1. Ash (*Fraxinus* sp.)
2. Aspen, Bigtooth (*Populus grandidentata*)
3. Aspen, Quaking (*Populus tremuloides*)
4. Baldcypress (*Taxodium distichum*)
5. Basswood (*Tilia americana*)
6. Beech, American (*Fagus americana*)
7. Birch, Black (*Betula lenta*)
8. Birch, River (*Betula nigra*)
9. Birch, White (*Betula papyrifera*)
10. Blackgum (*Nyssa sylvatica*)
11. Boxelder (*Acer negundo*)
12. Buckeye (*Aesculus glabra*)
13. Cherry, Black (*Prunus serotina*)
14. Cottonwood, Eastern (*Populus deltoides*)
15. Cucumber Tree (*Magnolia acuminata*)
16. Dogwood, Flowering (*Cornus florida*)
17. Elm (*Ulmus* sp.)
18. Fir, Balsam (*Abies balsamea*)
19. Fir, Douglas (*Pseudotsuga menziesii*)
20. Hackberry (*Celtis occidentalis*)
21. Hemlock, Eastern (*Tsuga canadensis*)
22. Hickory (*Carya* sp.)
23. Locust, Black (*Robinia, pseudoacacia*)
24. Maple, Red (*Acer rubrum*)
25. Maple, Silver (*Acer saccharinum*)
26. Maple, Sugar (*Acer saccharum*)
27. Oak, Blackjack (*Quercus marilandica*)
28. Oak, Black (*Quercus velutina*)
29. Oak, Chestnut (*Quercus montana*)
30. Oak, Northern Red (*Quercus rubra*)
31. Oak, Post (*Quercus stellata*)
32. Oak, Scarlet (*Quercus coccinea*)
33. Oak, Southern Red (*Quercus falcata*)
34. Oak, White (*Quercus alba*)
35. Pawpaw (*Asimina triloba*)
36. Pecan (*Carya illinoensis*)
37. Persimmon (*Diospyros virginiana*)
38. Pine, Eastern White (*Pinus strobus*)
39. Pine, Loblolly (*Pinus taeda*)
40. Pine, Longleaf (*Pinus palustris*)
41. Pine, Pitch (*Pinus rigida*)
42. Pine, Shortleaf (*Pinus echinata*)
43. Poplar, Yellow (*Liriodendron tulipifera*)
44. Red Bud (*Cercis canadensis*)
45. Redcedar, Eastern (*Juniperus virginiana*)
46. Sassafras (*Sassafras albidum*)
47. Sourwood (*Oxydendrum arboreum*)
48. Sweetgum (*Liquidambar styraciflua*)
49. Sycamore (*Platanus* sp.)
50. Walnut, Black (*Juglans nigra*)



# Equipment Identification List

1. Altimeter
2. Angle gauge
3. Ascender
4. Automatic level
5. Backpack fire pump
6. Bark gauge
7. Bulldozer
8. Canthook
9. Carabiner
10. Chainsaw
11. Chainsaw chaps
12. Clinometer
13. Combination tool
14. Data recorder
15. Densimeter
16. Diameter tape
17. Dot grid
18. Drip torch
19. Ear protection
20. Endloader
21. Feller buncher
22. Felling wedge
23. Fiberglass measuring tape
24. Fire rake
25. Fire shelter
26. Fire weather kit
27. Fire-swatter
28. First aid kit
29. Flow/current meter
30. GPS receiver
31. Hand compass
32. Hand lens/field microscope
33. Hip chain
34. Hypo-hatchet
35. Increment borer
36. Jacob staff
37. Log rule
38. Logger's tape
39. Maul
40. Peavy
41. pH meter
42. Planimeter
43. Plant press
44. Plastic flagging
45. Pole saw
46. Pruning Saw
47. Pulaski Axe
48. Relaskop
49. Safety glasses
50. Safety hard hat
51. Scale stick
52. Secchi disc
53. Soil sampler
54. Soil test kit
55. Staff compass
56. Stereoscope
57. Tally book
58. Tally meter
59. Timber tongs
60. Tree caliper
61. Tree harvester
62. Tree marking gun
63. Tree planting hoe or bar
64. Tree skidder
65. Water sampler
66. Water test kit
67. Wedge prism

# Tree Disorders Identification List

1. Aphid
2. Asian longhorn beetle
3. Butt or heart rot
4. Canker
5. Chemical damage
6. Cicada
7. Climatic injury: snow, wind, frost, drought, hail
8. Damping off
9. Douglas fir tussock moth
10. Emerald ash borer
11. Fir engraver beetle
12. Fire damage
13. Gypsy moth
14. Hemlock woolly adelgid
15. Ips engraver beetle
16. Landscape equipment damage
17. Lightning damage
18. Mechanical damage
19. Mistletoe
20. Mountain pine beetle
21. Nematode
22. Rust
23. Sawfly
24. Scale
25. Spruce budworm
26. Sunscald
27. Tent caterpillar
28. Wetwood or slime flux
29. Wildlife/Livestock damage

# Doyle Log Rule

## FORM CLASS 80

| 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  | 16  | 20    | 23  | 24    | 26  |       |      |       |      |
| 11  | 24  | 30    | 35  | 38    | 42  |       |      |       |      |
| 12  | 31  | 39    | 47  | 52    | 57  | 60    | 62   |       |      |
| 13  | 42  | 53    | 64  | 72    | 80  | 84    | 88   |       |      |
| 14  | 52  | 67    | 82  | 93    | 104 | 109   | 114  |       |      |
| 15  | 64  | 84    | 104 | 118   | 132 | 141   | 150  |       |      |
| 16  | 77  | 101   | 125 | 143   | 161 | 174   | 186  |       |      |
| 17  | 92  | 122   | 152 | 175   | 198 | 214   | 230  |       |      |
| 18  | 108 | 144   | 179 | 206   | 234 | 254   | 273  |       |      |
| 19  | 126 | 168   | 210 | 244   | 278 | 301   | 324  |       |      |
| 20  | 144 | 193   | 242 | 282   | 321 | 348   | 374  | 396   | 417  |
| 21  | 164 | 221   | 278 | 324   | 370 | 403   | 436  | 462   | 489  |
| 22  | 185 | 250   | 315 | 368   | 420 | 458   | 497  | 529   | 561  |
| 23  | 208 | 282   | 356 | 417   | 478 | 521   | 564  | 604   | 643  |
| 24  | 231 | 314   | 397 | 466   | 536 | 583   | 630  | 678   | 725  |
| 25  | 256 | 350   | 443 | 522   | 600 | 655   | 710  | 764   | 818  |
| 26  | 282 | 386   | 489 | 576   | 663 | 727   | 791  | 852   | 912  |
| 27  | 310 | 425   | 540 | 638   | 735 | 806   | 877  | 946   | 1015 |
| 28  | 339 | 466   | 592 | 700   | 807 | 885   | 963  | 1040  | 1118 |
| 29  | 370 | 509   | 648 | 766   | 884 | 970   | 1056 | 1144  | 1232 |
| 30  | 400 | 552   | 703 | 832   | 961 | 1055  | 1149 | 1248  | 1346 |

# Bd Ft Volume Estimation Worksheet

| Tree Number         | DBH | Number of Logs | Volume |
|---------------------|-----|----------------|--------|
| 1.                  |     |                |        |
| 2.                  |     |                |        |
| 3.                  |     |                |        |
| 4.                  |     |                |        |
| 5.                  |     |                |        |
| 6.                  |     |                |        |
| 7.                  |     |                |        |
| 8.                  |     |                |        |
| 9.                  |     |                |        |
| 10                  |     |                |        |
| <b>TOTAL VOLUME</b> |     |                |        |

Remember to record the DBH, Number of Logs and Total Volume on your Scantron sheet.