



NATIONAL
FFA ORGANIZATION

Forestry Handbook

2017-2021

Purpose

To stimulate student interest and to promote forestry instruction in the Agriculture science and technology curriculum and to provide recognition for those who have demonstrated skills and competencies as a result of forestry instruction.

Objectives

This event will provide the participant the ability to:

- To demonstrate skills and knowledge in timber cruising.
- To demonstrate skills in log scaling.
- To demonstrate how to read a compass.
- To identify tree species and tools used in the forestry industry.
- To demonstrate the ability to read a map.

Event Rules

1. Participants may wear modified official FFA dress for this event (black slacks or jeans for females or black jeans for males and appropriate footwear, appropriate clothing for inclement weather).
2. Teams consisting of four participants compete in all of the six different event areas. The top three individual scores will be used for the final team score. No alternates will be allowed.
3. Students will not be allowed to compete in the Agricultural Mechanic CDE event unless they can be at the line up for the second Agricultural Mechanic rotation.
4. Only simple calculators will be allowed in the Forestry CDE.
5. Absolutely no cell phones used during the Forestry CDE.
6. Declination for the State Career Development Event will be set at zero (0).
7. Participants in need of special accommodations (disability or other health issues) must submit the Idaho State FFA Career Development Events Request for Special Accommodation Application found at the end of the General Rules and Regulations at least one month prior to the event.

EVENT FORMAT AND SCORING

1. Timber Cruising (60 points)

Two classes of 2 trees will be cruised in 20 minutes per class. Participants will measure the DBH, measure the total tree height, and look up the board foot volume for each tree. DBH is given in 2-inch increments in the volume table. The standard practice for rounding diameters is as follows: A tree in the 12-inch diameter class will be between 11.1 inches and 13.0 inches in diameter.

A 14-inch diameter class tree will be between 13.1 inches and 15.0 inches in diameter. Tree height shall be measured from the base of the tree, on the most uphill side of the tree, to the highest point of the tree, standard rounding practices will be used to determine total tree height. For example, with a tree measuring from 65 to 74 feet tall, you would use the 70 foot tree height line. For a tree measuring between 85 to 94 feet tall, use 90 feet. In addition the participants will total the volumes of all 4 trees. For the state CDE, Timber Cruising will be bubbled in to the Timber Cruising section of the scansheet. DBH 1-4 and HT 1-4 will be used. Total volume will be bubbled in the volume section.

The card will be scored as follows:

- a. Diameter - 5 points per tree for the correct diameter, no partial credit will be given.
- b. Height - 5 points per tree for the correct height, no partial credit will be given.
- c. Total Volume – 20 points for the correct total volume, deduct 5 points for each + or -5% of difference from the correct volume.

2. Log Scaling (60 points)

5 Logs will be scaled in 20 minutes. Participants will identify the species, measure the small end diameter, measure the log length to the nearest 2 foot length class (at least 4 inches of trim is necessary), and the Scribner Decimal C board foot volume of the logs.

The card will scored as follows:

- a. Tree Species - 3 points per log for correctly identifying the species.
- b. Diameter – Not scored, but needed to determine correct Board Ft. Volume.
- c. Log length – Not scored, but log class is needed to determine correct Board Ft. Volume.
- d. Volume - 9 points per log for the correct log volume, deduct 3 points for each + or - 1 Scribner Decimal C board foot difference from the correct volume.
- e. When averaging the diameter of the log, you should always drop the halves. Divisions on the log scale stick are to the one-half inch, so no rounding is needed. This is only a factor when measuring a log that is oval shaped on the end and an average is used to determine the diameter. An example would be an oval log measures 8 inches across the short diameter, then measuring 90 degrees from the first measurement, the log measures 13 inches across the diameter. $8'' + 13'' = 21''$, $21''$ divided by 2 = 10.5'' inches. Because we do not misrepresent the amount of wood in the log we drop the .5'' making the correct diameter of the log 10 inches.

3. Compass and Pacing (60 points)

A course of 3 connecting points will be paced and measured with an azimuth compass by the participants. The range of allowable distance between the points will be from 50 to 250 feet apart. The time limit for this section is 20 minutes. The card will be scored as follows:

- a. Azimuth - 10 points will be given for the correct compass azimuth on each leg of the course and 1 point deducted for each + or - 2 degrees of difference from the correct answer. For the state CDE, Azimuth will be bubbled into the Compass Practicum – Azimuth section of the scansheet in 01, 02, and 03.
- b. Pacing - 10 points will be given for the correct distance in feet and 1 point will be deducted for each + or - 2 feet of difference from the correct distance. For the state CDE, Distance will be bubbled into the Compass Practicum – Distance section of the scansheet in 01, 02, and 03.

4. Tree Identification (60 points)

Participants will identify 20 tree species from the adopted list (See the Tree Identification Card) in 20 minutes. 3 points will be given for each tree or sample correctly identified. For the state CDE, Tree Identification will be bubbled into the Tree Identification section of the scansheet #1-20.

5. Tool Identification (60 points)

Participants will identify 20 commonly used forestry tools from the adopted list (Same list that is in effect for the National Event) in 20 minutes. 3 points will be given for each tool that is correctly identified. For the state CDE, Tool Identification will be bubbled into the Equipment Identification section of the scansheet #1-20.

6. Map Reading (60 points)

Participants will identify 10 map symbols from a USGS map and identify by matching 3 legal descriptions to their correct location on a map in 20 minutes. 40 acres will be the minimum size plot for the legal description portion of the contest. There will be 10 potential legal descriptions provided as possible answers for the plot descriptions.

Provide 10 options for each legal description for participants to choose from the card will be scored as follows:

- a. Map symbols - 2 points will be given for every correctly identified map symbol. For the state CDE, Map Symbols will be bubbled into the Forestry Disorders section of the scantron #1-10. Total of 20 points possible.
- b. Legal Descriptions - 8 points will be given for every plot on the map that is correctly matched with the proper legal description. 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. For the state CDE, Legal Descriptions will be bubbled into the Exam 2 section of the scantron in 01, 02, and 03. Total of 24 points possible.
- c. Multiple Choice – 4 Map questions worth 4 points will be given for correctly answered questions. For the state CDE, the test answers will be bubbled into the Exam 3 section of the scantron in #1-4. Total of 16 points possible.

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 sections down to 40 acre 1/4 sections in a parcel. Questions could be ask about contour intervals, type of terrain, direction of water flow, aspect of a slope, size of the map, 7.5 minute or 15 minute scales, and related simple map interpretation questions.

1. Examples:

- i. What is the legal description of the boxed area?
- ii. What is the item located at this point?
- iii. What is the acreage of the area enclosed?
- iv. In what section is the city of Marshall located?
- v. What is the elevation at this point?

Awards

Awards are presented to teams as well as individuals based upon their rankings. The top 10 teams and individuals will be recognized. Individuals from 1st through 5th place will receive medals. Teams from 1st through 5th place will receive plaques.

References and Assistance

The practical forestry skills that are required to compete in the event are by no means common knowledge to teachers and students. Rather, they involve specific knowledge of forestry and forest measurements.

Without a doubt, the best means for a student to acquire the necessary forestry skills is to spend several hours with a forester. A few hours of "hands-on" instruction with someone who knows the "tricks of the trade" cannot be over emphasized. Oftentimes these professionals are perfectly willing to help a team prepare and train for the forestry event.

Three excellent sources for assistance are the nearest office of the Idaho Department of Lands, Soil Conservation Service or Cooperative Extension Service. Woodland Foresters, district conservationists, and county agents will usually volunteer some of their time to help out. In many cases, the local U.S. Forest Service Ranger District can provide some assistance. Foresters working with local forest products companies are another source of information

It is strongly suggested that you acquire the following materials to prepare teams for the State FFA Forestry Event:

Event Training Aides:

1. Compass - Silva Ranger type 15 or Sunto Model MC-1
2. Diameter tape - Lufkin Model 120 TP
3. Clinometer - Sunto Model PM5-PC66

4. Scale stick - Conway-Cleveland-Coconino 36" Dec. C or Neiman- 36" with spud and square defect
5. Log tape - Spencer- 50" original Loggers tape
6. Reference materials -

A Manual of Instruction for Log Scaling and the Measurement of Timber Products, Voc. Ed. Bulletin Number 38. Available at UI Bookstore.

Guide to Field ID - Trees of North America, Brockman and Merrilees, Golden. Be an Expert with Map and Compass, Bjorn Kellstrom, Charles Scribner's Sons.

Ranger Model Compass - Instruction Manual, Silva, Inc., Highway 39 North, Laport, Indiana 46350.

Forestry Suppliers, Inc. Catalog, PO Box 8397, Jackson, Mississippi 39204.

Several USGS maps of your area - available from the Idaho Geological Survey office in Morrill Hall at UI.

Other materials that would be valuable for reference and training are as follows: North American Trees, Richard J. Preston, Iowa State Press, Ames, Iowa.

Elementary Forest Surveying and Mapping, R.L. Wilson, O.S.U. Bookstores, Corvallis, Oregon.

**FORESTRY CAREER DEVELOPMENT EVENT
TOOL AND EQUIPMENT IDENTIFICATION**

Name: _____

Participant No: _____

Directions:

Match the tagged tool with the number at right to the sample spaces below. (20 tools)

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

SCORE: _____

TOOLS

1. **Altimeter**
2. **Backpack Fire Pump**
3. **Bark Gauge**
4. **Canthook**
5. **Chainsaw**
6. **Chainsaw Chaps**
7. **Clinometer**
8. **Data Recorder**
9. **Densimeter**
10. **Diameter Tape**
11. **Dot Grid**
12. **Drip Torch**
13. **Fiberglass Tape**
14. **Fire Rake**
15. **Fire-Swatter**
16. **Fire Weather Kit**
17. **Flow/Current Meter**
18. **GPS Receiver**
19. **Hand Compass**
20. **Hand Lens/Field Microscope**
21. **Hip Chain**
22. **Hypo Hatchet**
23. **Increment Borer**
24. **Log Scale Stick**

Scantron Instructions:

Enter into the Equipment Identification section on the Scantron sheet #1-20.

TOOLS

25. **Logger’s Tape**
26. **pH meter**
27. **Planimeter**
28. **Plant Press**
29. **Plastic Flagging**
30. **Pulaski-Forester Axe**
31. **Relaskop**
32. **Safety Glasses**
33. **Safety Hard Hat**
34. **Soil Sampler**
35. **Soil Test Kit**
36. **Staff Compass**
37. **Stereoscope**
38. **Survey Instrument**
39. **Tally Book**
40. **Tally Meter**
41. **Tree Caliper**
42. **Tree Marking Gun**
43. **Tree Planting Hoe or Bar**
44. **Tree Stick**
45. **Water Sampler**
46. **Water Test Kit**
47. **Wedge Prism**
48. **Wheeler Caliper**

SCORING DIRECTIONS:

Three points for each correct answer. Maximum points equals 60. Record final score at the bottom of the card.

FORESTRY CAREER DEVELOPMENT EVENT

LOG SCALING

Name: _____

Participant No: _____

Score: _____

Five (5) logs will be scaled. Give the species of the log, measure the diameter of each log at the small end, measure the log length and using a scale stick, compute the board foot volume. Put the correct letter of the species in the space provided next to the log number from the list below:

SPECIES LIST:

- | | | | |
|-----------------|---------------------|--------------------|------------------------|
| 01. Douglas Fir | 02. Engleman Spruce | 05. Lodgepole Pine | 08. Western Larch |
| | 03. Grand Fir | 06. Ponderosa Pine | 09. Western Red Cedar |
| | 04. Hemlock | 07. Sub-Alpine Fir | 10. Western White Pine |

<u>Log No.</u>	<u>Species</u> <small>(2 digits on Forestry Disorder)</small>	<u>Diameter</u>	<u>Length</u>	<u>Board Ft. Volume using</u> <u>Scribner Dec. C</u> <small>(2 digits on Forestry Disorder)</small>
1	<u>FD 11</u> _____	_____	_____	<u>FD 16</u> _____
2	<u>FD 12</u> _____	_____	_____	<u>FD 17</u> _____
3	<u>FD 13</u> _____	_____	_____	<u>FD 18</u> _____
4	<u>FD 14</u> _____	_____	_____	<u>FD 19</u> _____
5	<u>FD 15</u> _____	_____	_____	<u>FD 20</u> _____

SCORING: Species - 3 points for each correct answer.

Diameter - Not scored, but necessary to determine Board Ft. Volume.

Length - Not scored, but correct log class is necessary to determine Board Ft. Volume.

Volume - 9 points for each correct volume. 3 point deducted for each + or - Dec. C board foot volume.

FORESTRY CAREER DEVELOPMENT EVENT

COMPASS READING - PACING

Name: _____

Participant No: _____ Score: _____

Three (3) different stations (stakes) will be designated in the field. You will be asked to give the true azimuth between each of the stations. You will then pace to determine the distance between each of the stations.

<u>Station</u>	<u>Azimuth</u>	<u>Distance</u>
1 - 2	_____	_____
	(Azim 01)	(Dist 01)
2 - 3	_____	_____
	(Azim 02)	(Dist 02)
3 - 1	_____	_____
	(Azim 03)	(Dist 03)

SCANTRON INSTRUCTIONS: Compass and Azimuth readings will be entered into the Compass Practicum – Azimuth and Compass Practicum – Distance areas on the back side of Scansheet. Please use three digit numbers when entering the Azimuth and Distance results (Example: Azimuth – 280, Distance 080)

SCORING: 10 points for each correct azimuth. Deduct 1 point for each + or - 2 degree in each azimuth. 10 points for each correct distance. Deduct 1 point for each 2 feet of error in distance.

Deduct total incorrect from 60 points maximum and note score at top of card.

FORESTRY CAREER DEVELOPMENT EVENT

TIMBER CRUISING

Name: _____

Participant No: _____

Score: _____

Measure the diameters at breast height and total tree height on four (4) trees. The volume table on this page will be used to determine the board foot volume of each tree. Cruising will be done with a diameter tape and a percent (%) or 1:66 clinometer.

Tree No.	Diameter at Breast Height (2 digits)	Total Height (2 digits)	Board Foot Volume (up to 5 digits + decimal)
1	DBH01	HT01	.0
2	DBH02	HT02	.0
3	DBH03	HT03	.0
4	DBH04	HT04	.0
Bubble 5 digits + 2 decimals Total Volume			

SCANSHEET: Timber Cruising component should be entered into the Timber Cruising section on the Scantron sheet.

SCORING:

- Diameter -** 5 points for each correct diameter. No partial credit.
Height - 5 points for each correct answer. No partial credit.
Total Volume - 20 points for correct total volume. 5 points deducted for each + or - 5 percent difference.
TOTAL: Maximum points equals 60.

Scribner Bd. Ft. Volume Table

dbh inches	Total Tree Height							
	50	60	70	80	90	100	110	120
12	30	50	70	90	100	120	140	160
14	50	70	100	130	160	180	200	220
16	70	100	140	170	200	240	260	300
18	100	150	170	220	260	290	330	370
20	140	170	210	260	310	360	400	440
22	170	210	260	310	370	420	470	520
24	210	260	310	370	430	490	540	610
26	260	310	370	430	490	550	630	690
28	310	370	430	490	550	640	710	780
30	370	430	490	550	640	710	790	880

**FORESTRY CAREER DEVELOPMENT EVENT
TREE IDENTIFICATION**

Name: _____

Participant No: _____

Directions:

Identify plant specimen by matching the correct tree or plant at right to the sample spaces below.

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

SCORE: _____

TREE OR PLANT

1. Alder
2. Ash Species
3. Aspen
4. Black Cottonwood
5. Black Walnut
6. Douglas Fir
7. Elm
8. Engleman Spruce
9. Grand Fir
10. Hemlock
11. Juniper
12. Lodgepole Pine
13. Maple Species
14. Nine Bark
15. Ocean Spray
16. Oregon Grape
17. Ponderosa Pine
18. Red Oak
19. Russian Olive
20. Snowberry
21. Sub-Alpine Fir
22. Sycamore
23. Western Larch
24. Western Paper Birch
25. Western Red Cedar
26. Western White Pine
27. Willow
28. White Oak

SCORING DIRECTIONS:

Three (3) points for each correct answer.

Deduct total incorrect from 60 points maximum and record score at the bottom of the card.

SCANTRON INSTRUCTIONS:

Your answers to the Tree Identification component should be entered under the "Tree Identification" Section on the front of the Scansheet #1-20.

Please enter the two digit number (example: 04) into each space on the Scantron Sheet

FORESTRY CAREER DEVELOPMENT EVENT MAP READING

Name: _____

Participant No: _____

Directions:

Match the number of the map symbols on the map with the proper symbol to the right.

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____
- 6. _____
- 7. _____
- 8. _____
- 9. _____
- 10. _____

SCORE: _____

MAP SYMBOLS

- 1. **Buildings**
- 2. **Bridge**
- 3. **Cemetery**
- 4. **Church**
- 5. **Contour Line**
- 6. **Gravel Pit, Mine, Quarry**
- 7. **Improved Road**
- 8. **Intermittent Stream**
- 9. **Lake**
- 10. **Lookout Station**
- 11. **Powerline**
- 12. **Primary Highway**
- 13. **Railroad**
- 14. **River or Stream**
- 15. **School**
- 16. **Spring**
- 17. **Trail**
- 18. **Unimproved or Primitive-Road**

SCORING DIRECTIONS:

Two (2) points for each correct answer. Maximum points equals 20.

SCANTRON INSTRUCTIONS:

Your answers to the Map Symbols component should be entered under the "Forestry Disorders" Section on the Scantron Sheet #1-10.

Please enter the two digit number (example: 04) into each space on the Scantron Sheet

FORESTRY CAREER DEVELOPMENT EVENT

Name: _____

Participant No: _____

Map Reading – Legal Descriptions

U.S.G.S., 15 minute quadrangle maps will be used. Choose the correct legal description from minimum size of 40 acres from the following list of ten descriptions (multiple choice) by reading each description and then putting the letter of the correct description in the blank provided below which corresponds to the numbered location on the map.

1. _____ (Exam 2 number 1)

2. _____ (Exam 2 number 2)

3. _____ (Exam 2 number 3)

SCORING: Eight (8) points for each correct answer. Maximum points equals 24.

SCANTRON INSTRUCTIONS:

The Legal Descriptions answers will be entered into 1 to 3 on Exam 2 of the Scantron Sheet.

FORESTRY CAREER DEVELOPMENT EVENT

Name: _____

Participant No: _____

Map Reading Multiple Choice

Participants will answer questions using a furnished United States Geological Survey topographic map.

1. _____ (Exam 3 number 1)
2. _____ (Exam 3 number 2)
3. _____ (Exam 3 number 3)
4. _____ (Exam 3 number 4)

SCORING: Four (4) points each correct answer. Maximum points equals 16

SCANTRON INSTRUCTIONS: Test answers will be bubbled into the Exam 3 section of the scantron in #1-4.

Exam 2

1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E
11	A	B	C	D	E
12	A	B	C	D	E
13	A	B	C	D	E
14	A	B	C	D	E
15	A	B	C	D	E
21	A	B	C	D	E
22	A	B	C	D	E
23	A	B	C	D	E
24	A	B	C	D	E
25	A	B	C	D	E

LEGAL DESCRIPTIONS

9	A	B	C	D	E
10	A	B	C	D	E
19	A	B	C	D	E
20	A	B	C	D	E
29	A	B	C	D	E
30	A	B	C	D	E

Exam 3

1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E
6	A	B	C	D	E
7	A	B	C	D	E
11	A	B	C	D	E
12	A	B	C	D	E
13	A	B	C	D	E
14	A	B	C	D	E

MAP QUESTIONS

LOG SCALING

Practicums

1	2	3
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
4	5	6
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9

25	0	1	2	3	4	5	6	7	8	9	0
24	0	1	2	3	4	5	6	7	8	9	0
23	0	1	2	3	4	5	6	7	8	9	0
22	0	1	2	3	4	5	6	7	8	9	0
21	0	1	2	3	4	5	6	7	8	9	0
20	0	1	2	3	4	5	6	7	8	9	0
19	0	1	2	3	4	5	6	7	8	9	0
18	0	1	2	3	4	5	6	7	8	9	0
17	0	1	2	3	4	5	6	7	8	9	0
16	0	1	2	3	4	5	6	7	8	9	0
15	0	1	2	3	4	5	6	7	8	9	0
14	0	1	2	3	4	5	6	7	8	9	0
13	0	1	2	3	4	5	6	7	8	9	0
12	0	1	2	3	4	5	6	7	8	9	0
11	0	1	2	3	4	5	6	7	8	9	0
10	0	1	2	3	4	5	6	7	8	9	0
9	0	1	2	3	4	5	6	7	8	9	0
8	0	1	2	3	4	5	6	7	8	9	0
7	0	1	2	3	4	5	6	7	8	9	0
6	0	1	2	3	4	5	6	7	8	9	0
5	0	1	2	3	4	5	6	7	8	9	0
4	0	1	2	3	4	5	6	7	8	9	0
3	0	1	2	3	4	5	6	7	8	9	0
2	0	1	2	3	4	5	6	7	8	9	0
1	0	1	2	3	4	5	6	7	8	9	0

EQUIPMENT ID

Forestry Disorders

1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9
11	12	13	14	15	16	17	18	19	20
0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9

MAP SYMBOLS

Compass Practicum

1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9
1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9

AZIMUTH

DISTANCE