

FORESTRY

Purpose

The Missouri FFA Forestry Career Development Event is designed to stimulate student interest and to promote the forestry 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

- I. Understand and have a basic knowledge of forestry and agroforestry principles.
- II. Identify trees native to Missouri.
- III. Correctly measure tree diameters and merchantable heights and determine board foot volumes.
- IV. Understand and properly apply forest stand improvement principles and practices.
- V. Recognize tools and equipment used by professional foresters.
- VI. Identify tree or forest disorders commonly found in Missouri .
- VII. Interpret topographic maps correctly.

Crosswalk with Show Me Standards

Objectives – Students participating in the Career Development Event should be able to:		Show-Me Standards	
		Knowledge Standards (Content Areas)	Performance Standards (Goals)
1.	Ability to understand and have a basic knowledge of forestry and agroforestry principles.	CA.3	1.3, 1.4, 1.5, 1.8
2.	Ability to identify trees common to Missouri.	MA.1, MA.2, MA.3	3.2, 3.4, 3.8
3.	Ability to recognize tools and equipment and their uses in forest management.		
4.	Ability to inventory standing timber.	SC.3, SC.4, SC.8 SS.4	4.4, 4.8
5.	Ability to understand timber stand improvement principles.		
6.	Ability to interpret topographic maps and understand legal descriptions.		
7.	Ability to identify common tree or forest disorders.		

Corresponding Secondary Agriculture Curriculum			
Course and/or Curriculum:	Agricultural Science II	Unit(s):	Forestry
	Forest Management		All Units
	Plant Science Curriculum		Forestry

Event Format

The Forestry CDE shall consist of the following seven (7) components:

A. General Knowledge - 100 pts - 30 minutes

1. Fifty (50) multiple-choice or true/false questions will test the participant's knowledge and understanding of basic forestry and agroforestry principles and concepts.
2. Each question will be worth 2 points.
3. Participants will be allowed 30 minutes to complete this phase of the event.

B. Tree Identification - 100 pts - 30 minutes

1. Twenty (20) live specimens from the tree identification specimen list will be shown to participants to identify by common names.
2. Each specimen will be designated by a number.
3. Each specimen will be worth 5 points.
4. Participants will be allowed 30 minutes complete this phase of the event.
5. All specimens must be alive and growing within the timber stand.

C. Tree Measurement and Board Foot Volume Determination - 100 pts - 30 minutes

- Each participant will measure ten (10) marked trees on a plot for board foot volume.
- Each tree will be designated by a number.
- The participant must record the DBH (Diameter Breast Height) to the nearest two inches.
- The participant must record the merchantable height of each tree rounded down to the nearest ½ log.
- Each participant is to ASSUME A LOSS of one inch in diameter outside bark for every four feet of tree stem.
- Volume tables will be provided at the event.
- The following minimum diameters and log length will be:

Minimum Saw Timber Specifications

DBH	12 inches
Top Diameter	10 inches outside bark
Height (length)	8 feet (1/2-log)

- Merchantable height stops are estimated to the upper point on a tree where it becomes 10 inches in diameter outside bark 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.
- Two (2) points per tree for the correct species identification for a total of 20 points
- Three (3) points per tree for the correct DBH for a total of 30 points.
- Three (3) points per tree for the correct height for a total of 30 points.
- Twenty (20) points will be given for the correct total volume.
- Two (2) points will be deducted for each five percent deviation (plus or minus) from the correct total measured volume.
- Participants will be allowed 30 minutes to complete this phase of the event.

D. Forest Management Evaluation - 60 points - 20 minutes

- An area will be selected and identified by ribbons, paint, rope, etc.
- The area will contain fifteen (15) marked trees.
- Marked trees will be designated by a number.
- All trees in the selected area will be considered as a forest management site, and the participants will score each marked tree using one of the following options:
 - **Harvest:** Utilize the tree.
 - **Leave:** The tree should remain in stand for a good reason.
 - **Deaden:** Undesirable tree, not merchantable or beneficial to wildlife, should be deadened or cut down and left in woods.
- 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 the following:
 - Markets available.
 - Wildlife considerations.
 - Present condition of stand.
 - Management plan.
- The trees selected and designated for use in this part of the event may be all of one species or a mixture of species.
- Each marked tree will be worth 4 points.
- Participants will be allowed 20 minutes to complete this phase of the event.

DI. Equipment Identification - 40 points - 20 minutes

- Twenty (20) 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.
- Each piece of equipment will be worth 2 points
- Participants will be allowed 20 minutes to complete this phase of the event.

DII. Tree/Forest Disorders - 60 points - 15 minutes

- Signs and/or symptoms of ten (10) 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
- A number will designate each set of symptoms representing a disorder.
- Each disorder will be worth 6 points.
- Participants will be allowed 15 minutes to complete this phase of the event

G. Map Interpretation - 50 points - 15 minutes

- Participants will answer ten (10) 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
- Each question will be worth 5 points
- Participants will be allowed 15 minutes to complete this phase of the event.

Event Scoring

Event	Points
General Knowledge (50 questions @ 2 pts each)	100
Identification (20 plants at 5 pts each)	100
Tree measurement & Board Foot Volume Determination	100
Forest Management Evaluation	60
Equipment ID (20 @ 2 pts each)	40
Tree / Forest Disorders (10 @ 6 pts each)	60
Map Interpretation (10 questions @ 5 pts each)	50
TOTAL	510

1. **Tie scores among teams in all events should be broken using the high individual team member's score.** In case the scores are tied, the scores of the second high individual on each team should be used.

Event Rules and Regulations

1. Under no circumstances will any contestant be allowed to touch or handle plant material during the contest, with the exception of the tree measuring activity. Any infraction of this will be sufficient cause to eliminate the team from the contest.
2. Observers will not be permitted in the contest area while the contest is in progress.
3. No contest team, team member, or team coach shall visit the contest facilities to observe plant materials and facilities prior to the contest.
4. Any contestant caught cheating during the contest will, along with his/her team members, be expelled from the contest.
5. All contestants are expected to be prompt at their stations throughout the contest. No provisions will be made for tardiness and will most certainly cause late contestants to lose contest points.

6. Contestants will be assigned to group leaders who will escort them to various contest staging lines. Each contestant is to stay with his or her group leader throughout the contest or until told to change leaders by the contest superintendent.
7. All contestants will be given a contestant number by which they will be designated throughout the contest.
8. Contestants must come to the contest prepared to work in adverse weather conditions. The contest will be conducted regardless of weather conditions, except those outlined in the FFA Severe Weather Guidelines in the General Guidelines section. Contestants should have heavy coats and other warm clothes and footwear. **NO open-toed shoes will be allowed.**
9. Tools and Equipment: All tools and equipment will be furnished for the contest. Contestants must use the tools and equipment furnished at the contest site for all instructional areas, with the exception that contestants may provide their own Biltmore stick.
10. **Written Materials: All written materials will be furnished for the contest. At the state contest, each contestant will receive:**
 - a. Scansheet to mark all answers
 - b. Contestant Reference Sheet A – Tree Identification
 - c. Contestant Reference Sheet B – Forestry Equipment List
 - d. Contestant Reference Sheet C – Tree Disorders
 - e. Contestant Reference Sheet D - Tree Measurement Tally Sheet
11. Contestants should provide clipboards and pencils. Electronic calculators and magnifying glasses will be allowed.

Test References

- Missouri Forest Management Guidelines Unit I: Background Resource Elements
<http://mdc.mo.gov/trees-plants/forest-care/missouri-forest-management-guidelines>
Chapter 1: Missouri Forest Resources
Chapter 2: Wildlife Habitat
Chapter 5: Forested Watersheds
Chapter 8: Forest Products
Chapter 9: Forest Health
- Missouri Forest Management Guidelines Unit II: Foundations of Forest Management
Chapter 11: Generally Accepted Principles for Silviculture
Chapter 12: Fundamentals of Forest Regeneration
- Missouri Forest Management Guidelines Unit III: Standards, Guidelines and BMP's
Chapter 13: Tending Treatments
Chapter 14: Forest Roads/Trails
Chapter 15: Timber Harvesting
Chapter 16: Pesticide Use
Chapter 17: Fire Management
- “Missouri FFA Forestry CDE Training Guide”, Dr. Hank Stelzer, 2022. Located on the DESE website under the General Curriculum Cont. tab.
- Forest Management for Missouri Landowners, MDC Most recent edition, Bruce Palmer Available from your local MDC Field office.

Training References

“Missouri FFA Forestry CDE Training Guide”, Dr. Hank Stelzer, 2022. Located on the DESE website under the General Curriculum Cont. tab.

Forest Management for Missouri Landowners, MDC Most recent edition, Bruce Palmer Available at: Located on the DESE website under the General Curriculum Cont. tab.

50 Common Trees of Missouri, MDC 2005, David Knotts

Missouri's Oaks and Hickories, Missouri Department of Conservation Field Guide, Reprinted from the August and December 1993, and January 1994 *Missouri Conservationist* by the Conservation Commission of the State of Missouri. Located on the DESE website under the General Curriculum Cont. tab.

Trees of Missouri Field Guide, MDC 2003, Don Kurz

Online: Tree & Plant Diseases/Pests Missouri Department of Conservation

Equipment ID References

“Missouri FFA Forestry CDE Training Guide”, Dr. Hank Stelzer, 2022. Located on the DESE website under the General Curriculum Cont. tab.

Tree Identification List

ELM

01. **American Elm** *Ulmus americana*

02. **Slippery Elm** *Ulmus rubra*

HICKORY

03. **Bitternut Hickory** *Carya cordiformis*

04. **Mockernut Hickory** *Carya tomentosa*

05. **Pecan** *Carya illinoensis*

06. **Shagbark Hickory** *Carya ovata*

MAPLE

07. **Boxelder** *Acer negundo*

08. **Red Maple** *Acer rubrum*

09. **Silver maple** *Acer saccharinum*

10. **Sugar maple** *Acer saccharum*

OAK

11. **Black Oak** *Quercus velutina*

12. **Blackjack Oak** *Quercus marilandica*

13. **Bur Oak** *Quercus macrocarpa*

14. **Chinkapin Oak** *Quercus muehlenbergii*

15. **Northern Red Oak** *Quercus rubra*

16. **Pin Oak** *Quercus palustris*

17. **Post Oak** *Quercus stellata*

18. **Scarlet Oak** *Quercus coccinea*

19. **Shingle Oak** *Quercus imbricaria*

20. **White Oak** *Quercus alba*

OTHER

21. **American Basswood** *Tilia americana*

22. **American Plum** *Prunus americana*

23. **American Sycamore** *Platanus occidentalis*

24. **Ash** *Fraxinus* spp

25. **Baldcypress** *Taxodium distichum*

26. **Black Cherry** *Prunus serotina*

27. **Black Locust** *Robinia pseudoacacia*

28. **Black Walnut** *Juglans nigra*

29. **Blackgum** *Nyssa sylvatica*

30. **Downy Serviceberry** *Amelanchier arborea*

31. **Eastern Cottonwood** *Populus deltoides*

32. **Eastern Hophornbeam** *Ostrya virginiana*

33. **Eastern Redbud** *Cercis canadensis*

34. **Eastern Redcedar** *Juniperus virginiana*

35. **Flowering Dogwood** *Cornus florida*

36. **Hackberry** *Celtis occidentalis*

37. **Hawthorn** *Crataegus* spp.

38. **Honeylocust** *Gleditsia triacanthos*

39. **Kentucky Coffeetree** *Gymnocladus dioicus*

40. **Ohio Buckeye** *Aesculus glabra*

41. **Osage-orange** *Maclura pomifera*

42. **Pawpaw** *Asimina triloba*

43. **Persimmon** *Diospyros virginiana*

44. **Red Mulberry** *Morus rubra*

45. **River Birch** *Betula nigra*

46. **Sassafras** *Sassafras albidum*

47. **Shortleaf Pine** *Pinus echinata*

48. **Sweetgum** *Liquidambar styraciflua*

49. **Yellow Poplar** *Liriodendron tulipifera*

50. **Willow** *Salix* spp.

Forestry Equipment Identification Specimen List

Directions: Bubble in the correct number of the specimen.
Two points each for a total of 40 points.

01. Backpack Water Pump		17. Hard Hat
02. Bark Guage		18. Increment Borer
03. Biltmore Stick		19. Insect Trap
04. Broom Rake		20. Laser Rangefinder/Hypsometer
05. Chainsaw		21. Loppers
06. Chaps		22. Peavy-Canthook
07. Clinometer		23. Pruning Saw
08. Compass		24. Pulaski-Forester Axe
09. Cruising Vest		25. Safety Glasses
10. Densiometer		26. Log Scale Stick
11. Diameter Tape		27. Sling Psychrometer
12. Digital Data Recorder		28. Tree Caliper
13. Drip Torch		29. Tree Marking Gun
14. Draw Knife / Bark Scribe		30. Tree Planting Bar/Dibble bar
15. Hearing Protection		31. Wedge Prism
16. GPS Unit		

Forest Stand Improvement Instructions

Directions: Evaluate each tree using the information given upon arriving on site.

Determine whether each tree will be:

H for Harvest: Utilize the tree

L for Leave: The tree should remain in the stand for a good reason

D for Deaden: Undesirable tree, not merchantable OR beneficial for wildlife. Should be deadened or cut down and left in the woods.

Tree / Forest Disorder Identification Specimen List

- 01. Air Pollution**
- 02. Anthracnose**
- 03. Armillaria Root Rot**
- 04. Asian Longhorned Beetle**
- 05. Autumn-Olive**
- 06. Butt (heart) Rot**
- 07. Burning Bush**
- 08. Bush Honeysuckle**
- 09. Callery Pear**
- 10. Canker (other than Hypoxylon or Thousand Cankers)**
- 11. Cedar-apple Gall Rust**
- 12. Cicada**
- 13. Climatic Injury (snow/ice, wind, drought, hail)**
- 14. Emerald Ash Borer**
- 15. Fire Damage**
- 16. Spongy Moth (gypsy moth)**
- 17. Herbicide Damage**
- 18. Hypoxylon Canker**
- 19. Japanese beetle**
- 20. Landscape Equipment Damage**
- 21. Lightning Damage**
- 22. Oak Gall**
- 23. Oak Skelentonizer**
- 24. Oak Wilt**
- 25. Pine Wilt Nematode**
- 26. Pine Sawfly**
- 27. Scale**
- 28. Spotted Lanternfly**
- 29. Sunscald**
- 30. Tent Caterpillar**
- 31. Thousand Cankers Disease**
- 32. Tree-of-heaven**
- 33. Wildlife/livestock Damage**
- 34. Wetwood or Slime Flux**
- 35. Wood Borer**

Tree Measurement Tally Sheet

Tree No.	Species	DBH	# 16-ft Logs	Board-foot Volume
			Total	

Tree Scale (International 1/4-Inch Rule)

DBH (in)	Number of 16-foot Logs							
	1/2	1	1 1/2	2	2 1/2	3	3 1/2	4
12	30	60	80	100	120			
14	40	80	110	140	160	180		
16	60	100	150	180	210	250	280	310
18	70	140	190	240	280	320	360	400
20	90	170	240	300	350	400	450	500
22	110	210	290	360	430	490	560	610
24	130	250	350	430	510	590	660	740
26	160	300	410	510	600	700	790	880
28	190	350	480	600	700	810	920	1020
30	220	410	550	690	810	930	1060	1180
32	260	470	640	790	940	1080	1120	1360
34	290	530	730	900	1060	1220	1380	1540
36	330	600	820	1010	1200	1380	1560	1740
38	370	670	910	1130	1340	1540	1740	1940
40	420	740	1010	1250	1480	1700	1920	2160
42	460	820	1100	1360	1610	1870	2120	2360