



**New Mexico FFA**

# **Forestry**

**Career Development Event**

# Forestry

## Career Development Event Handbook

Revised December 2023

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### PURPOSE

The New Mexico 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 as a result of forestry instruction in the agriculture education classrooms.

### OBJECTIVES

This event will provide the participant the ability 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 New Mexico, the United States and internationally.
- ❖ Recognize and understand approved silvicultural practices in New Mexico and the United States.
- ❖ Identify forest disorders
- ❖ Understand how to take a forest inventory
- ❖ Understand marketing management strategies.
- ❖ Recognize safety practices in forest management.
- ❖ Identify hand tools, equipment, and their use in forestry management.

### COMMON CORE REFERENCES

#### **7th Grade:**

**CCSS.Math.Content.7.G.B.4** Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

#### **8th Grade:**

**MS-LS2-5.** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.\*

#### **9-10th Grade:**

**CCSS.Math.Content.HSG-MG.A.1** Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★

#### **11-12th Grade:**

**CCSS.ELA-Literacy.RST.11-12.9** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible

## **EVENT FORMAT**

### **INDIVIDUAL ACTIVITIES**

#### **GENERAL KNOWLEDGE EXAM**

- ❖ Fifty (50) 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 the basic principles of forestry.
- ❖ Each participant will be allowed 45 minutes to complete this phase of the event.
- ❖ Each question will be worth 2 points, for a total maximum score of 100 points.

#### **TREE IDENTIFICATION**

- ❖ Twenty (20) live specimens, pressed samples, fresh leaf samples, cones or seeds, or branches from the tree identification specimen list will be displayed for participants to identify by common names.
- ❖ An identification list will be provided to participants.
- ❖ Each participant will be allowed a maximum of 2 minutes at each specimen with a total of forty minutes allowed for the practicum.
- ❖ There is no restriction on the number of duplicate specimens included in the practicum.
- ❖ Specimens may not be touched.
- ❖ Each specimen identified correctly is worth 2 points for a total maximum score of forty (40) points.

#### **EQUIPMENT/CHAINSAW PART IDENTIFICATION**

- ❖ Twenty (20) actual samples, pictures or slides or written description of items from the equipment/chainsaw parts list will be displayed for participants to identify.
- ❖ An identification list will be provided to participants.
- ❖ Each participant will be allowed a maximum of two (2) minutes at each specimen with a total of forty (40) minutes allowed for the practicum.
- ❖ Specimens may not be touched.
- ❖ Each specimen identified correctly is worth 2 points for a total maximum score of forty (40) points.

#### **TREE/FOREST DISORDERS IDENTIFICATION**

- ❖ Twenty (20) actual samples or pictures or slides or written description of items from the tree/forest disorders list will be displayed for participants to identify.
- ❖ An identification list will be provided to participants.
- ❖ Each participant will be allowed a maximum of two (2) minutes at each specimen with a total of forty (40) minutes allowed for the practicum.
- ❖ Specimens may not be touched.
- ❖ Each specimen identified correctly is worth two (2) points for a total maximum score of forty (40) points.

#### **COMPASS PRACTICUM**

- ❖ 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 compass practicum will have five (5) marked points.
- ❖ Participants will start at any point and record the azimuth and distance to the next point.
- ❖ Participants are responsible for bringing compasses to the event.
- ❖ Calculators are permitted during the event and participants are responsible for bringing them to events other than state contest. They will be supplied at state contest.

- ❖ No other electronic devices are allowed during the event.
- ❖ Each participant is allowed forty (40) minutes for the event.
- ❖ Each correct azimuth and each correct distance is worth five (5) points each for a maximum score of fifty (50) points.
- ❖ Partial credit will be given with a deduction of one (1) point for each two (2) degrees or two (2) feet the participant is off the correct answer.

## TEAM ACTIVITY

### TREE MEASUREMENT PRACTICUM

- ❖ Teams will measure five (5) pre-numbered trees
- ❖ They will record the DBH (diameter breast height) computed to the nearest whole number.
- ❖ They will record the height of each tree from the base (at the ground) to the top (top of branches) computed to the nearest foot.
- ❖ **Students are not allowed to use any type of measuring tape or tool to measure out 100' from the tree to 54" from the ground to determine DBH.**
- ❖ The volume of the tree will be determined using the height and the diameter of the tree. **If the tree volume is off the chart the student will enter 000 for volume. Add all 5 volumes and enter them in volume section.**
- ❖ Volume table will be provided
- ❖ The team is allowed 40 minutes for the event
- ❖ Each chapter is responsible for bringing either a clinometer or tree stick and a D-tape to the event.
- ❖ Pacing must be utilized to determine distance from the tree when using a clinometer or tree stick. )
- ❖ Each correct tree height and DBH is worth four (4) points each. Each correct volume is worth two (2) points.
- ❖ Partial credit will be given with a deduction of one point for each 1/10<sup>th</sup> off the correct DBH and each foot off the correct height.
- ❖ No partial credit is given for an incorrect volume.

## SCORING

Activities:	Individual Points	Team Points
General Knowledge Exam	100	300
Tree Identification	40	120
Equipment/Chainsaw Identification	40	120
Tree/Forest Disorders Identification	40	120
Compass Practicum	50	150
Tree Measurement Practicum	50	150
Total Points Possible	320	960

## REFERENCES

### GENERAL KNOWLEDGE EXAM

- ❖ Introduction to Forestry Science, Burton, Delmar Publications (newest edition)
- ❖ Science of Forestry Management, Kris Irwin, University of Georgia, AAVIM (first edition)
- ❖ Husqvarna publication, How to Work with a Chainsaw (.pdf file)

### TREE IDENTIFICATION

- ❖ Tree Identification Study Guide (2 .pdf files)
- ❖ Trees & Shrubs of New Mexico, Jack L. Carter
- ❖ Dendrology at Virginia Tech, <http://dendro.cnre.vt.edu/dendrology/main.htm>

### EQUIPMENT/CHAINSAW PART IDENTIFICATION

- ❖ Science of Forestry Management, Kris Irwin, University of Georgia, AAVIM (first edition)
- ❖ Stihl Chainsaw Safety Manual (.pdf file pages 28-31)

### FOREST/TREE DISORDERS IDENTIFICATION

- ❖ Field Guide to Insects and Diseases of Arizona and New Mexico  
<https://www.fs.fed.us/r3/resources/health/field-guide/index.shtml>
- ❖ Bugwood, <http://www.bugwood.org>
- ❖ Carpenterworm [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5349700.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5349700.pdf)
- ❖ Emerald ash borer <https://www.forestpests.org/acrobat/eabfg.pdf>
- ❖ Boxelder [https://wiki.bugwood.org/NPIP:Boisea\\_trivittata](https://wiki.bugwood.org/NPIP:Boisea_trivittata)
- ❖ Wood wasp [https://wiki.bugwood.org/Sirex\\_noctilio](https://wiki.bugwood.org/Sirex_noctilio)
- ❖ Bagworm [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5347210.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5347210.pdf)
- ❖ Gypsy Moth [https://wiki.bugwood.org/Lymantria\\_dispar](https://wiki.bugwood.org/Lymantria_dispar) and page 121 in Science of Forestry Management
- ❖ Cicadas <https://www.desertusa.com/insects/cicada.html> and page 125 in Science of Forestry Management

### COMPASS PRACTICUM

- ❖ <https://www.idl.idaho.gov/forestry/contest/5.0-FC-Manual-CompassPacing2014.pdf>

### TREE MEASUREMENT PRACTICUM

- ❖ [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5202838.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5202838.pdf)

## STANDING TREE BOARD FOOT VOLUME TABLE

<b>Table 2. Standing Tree Board Foot Volumes—International 1/4-Inch Rule</b>								
<b>Dbh (inches)</b>	<b>Number of 16-Foot Logs</b>							
	<b>1/2</b>	<b>1</b>	<b>1-1/2</b>	<b>2</b>	<b>2-1/2</b>	<b>3</b>	<b>3-1/2</b>	<b>4</b>
<b>Board Feet</b>								
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	1,020
30	220	410	550	690	810	930	1,060	1,180
32	260	470	640	790	940	1,080	1,220	1,360
34	290	530	730	900	1,060	1,220	1,380	1,540
36	330	600	820	1,010	1,200	1,380	1,560	1,740
38	370	670	910	1,130	1,340	1,540	1,740	1,940
40	420	740	1,010	1,250	1,480	1,700	1,920	2,160
42	460	820	1,100	1,360	1,610	1,870	2,120	2,360

From: Ashley, Burl S. 1980. *Reference handbook for foresters*. USDA NA-FR-15. 35 pp.

## EQUIPMENT and CHAINSAW IDENTIFICATION LIST

1	Adjusting wheel of quick tensioner	41	Hand lens
2	Adze hoe	42	Handle of wingnut
3	Altimeter	43	Hard hat
4	Backpack sprayer	44	Hip chain
5	Bark Gauge	45	Hypo-hatchet
6	Bumper spike	46	Increment borer
7	Cant hook	47	Log rule
8	Carburetor adjusting screws	48	Log scale stick/Biltmore stick
9	Chain brake	49	Master Control lever
10	Chain catcher	50	Muffler
11	Chain sprocket	51	Oil filler cap
12	Chain sprocket cover	52	Oilomatic saw chain
13	Chain tensioner (front)	53	pH meter
14	Chain tensioner (side)	54	Planimeter
15	Chainsaw	55	Plant press
16	Chainsaw chaps	56	Planting shovel
17	Clinometer	57	Pulaski
18	Data recorder	58	Rear hand guard
19	Decompression valve	59	Rear handle
20	Densimeter	60	Relaskop
21	Diameter tape	61	Safety goggles
22	Dibble bar	62	Soil sampler
23	Dot grid	63	Soil test kits
24	Drip torch	64	Spark plug boot
25	Fiberglass measuring tape	65	Spark plug
26	Field microscope	66	Staff compass
27	Fire plow	67	Starter grip
28	Fire rake	68	Stereoscope
29	Fire shelter	69	Surveying Instruments
30	Fire swatter	70	Tally book
31	Fire weather kit	71	Tally meter
32	Flagging	72	Throttle trigger
33	Flow/current meter	73	Throttle trigger interlock
34	Front hand guard	74	Tree caliper
35	Front handle (handlebar)	75	Tree marking gun
36	Fuel filler cap	76	Tree planting bar
37	Fuel pump	77	Twist Lock
38	Global Positioning System (GPS)	78	Water sampler
39	Guide bar	79	Water test kit
40	Hand compass	80	Wedge prism
		81	Wheeler caliper

## TREE DISORDERS IDENTIFICATION LIST

1	Animals	19	Fir Looper
2	Aphids	20	Gypsy Moth
3	Bag worm	21	Mechanical damage
4	Bark Beetles – Dendroctonus	22	Needleminers
5	Bark Beetles – Ips	23	Pine Needle Scale
6	Blue Stain Fungi	24	Pine Tip Moths
7	Boxelder Bug	25	Pinyon Needle Scale
8	Carpenter Ants	26	Pinyon Spindle Gall Midge
9	Carpenter worm	27	Sawflies
10	Chemical applications	28	Termites
11	Cicadas	29	Tiger Moth
12	Cooley Spruce Gall Adelgid	30	True Mistletoe
13	Douglas-fir Tussock Moth	31	Western Spruce Budworm
14	Dwarf Mistletoe	32	Western Tent Caterpillar
15	Emerald Ash Borer	33	White Pine Blister Rust
16	Environmental factors	34	Wood Borers – Longhorn
17	Fall Webworm	35	Wood Borers – Metallic
18	Fir Engraver	36	Wood Wasp

## TREE IDENTIFICATION LIST

1	Algerita	17	Pecan
2	Arizona ash	18	Pinyon pine
3	Arizona cypress	19	Ponderosa pine
4	Arizona sycamore	20	Quaking aspen
5	Arizona walnut	21	Rio Grande cottonwood
6	Blue Spruce	22	Rocky Mountain juniper
7	Boxelder	23	Rocky Mountain Maple
8	Catclaw acacia	24	Salt cedar
9	Desert willow	25	Sandbar willow
10	Douglas-fir	26	Scots pine
11	Eldarica pine	27	Screwbean mesquite
12	Gambel oak	28	Shrub live oak
13	Honey mesquite	29	Southwestern pine
14	Netleaf hackberry	30	Thinleaf alder
15	New Mexico locust	31	Water birch
16	Oneseed juniper	32	White fir