

# New Mexico Career and Leadership Development Events Handbook – Forestry

## **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 1/10 of an inch.
- ❖ 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.
- ❖ The volume of the tree will be determined using the height and the diameter of the tree.
- ❖ 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/eabfq.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)

## TREE IDENTIFICATION LIST

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

## EQUIPMENT IDENTIFICATION LIST

1. Bark Gauge
2. Clinometer
3. Diameter tape
4. Increment borer
5. Log scale stick/Biltmore stick
6. Relaskop
7. Tree caliper
8. Tree marking gun
9. Wedge prism
10. Data recorder
11. Dot grid
12. Flagging
13. Log rule
14. Tally book
15. Tally meter
16. Altimeter
17. Fiberglass measuring tape
18. Global Positioning System (GPS)
19. Hand compass
20. Staff compass
21. Hip chain
22. Planimeter
23. Stereoscope
24. Surveying Instruments
25. Wheeler caliper
26. Cant hook
27. Chainsaw
28. Chainsaw chaps
29. Tree planting bar
30. Dibble bar
31. Planting shovel
32. Hypo-hatchet
33. Adze hoe
34. Backpack sprayer
35. Drip torch
36. Hard hat
37. Safety goggles
38. Pulaski
39. Fire plow
40. Fire rake
41. Fire shelter
42. Fire swatter
43. Fire weather kit
44. Densimeter
45. Field microscope
46. pH meter
47. Hand lens
48. Flow/current meter
49. Plant press
50. Soil test kits
51. Water sampler
52. Water test kits

## CHAINSAW IDENTIFICATION LIST

1. Twist lock
2. Carburetor adjusting screws
3. Fuel pump
4. Decompression valve
5. Chain brake
6. Muffler
7. Chain sprocket
8. Chain sprocket cover
9. Chain catcher
10. Chain tensioner (side)
11. Chain tensioner (front)
12. Guide bar
13. Oilomatic saw chain
14. Adjusting wheel of quick tensioner
15. Handle of wingnut
16. Oil filler cap
17. Bumper spike
18. Front hand guard
19. Front handle (handlebar)
20. Starter grip
21. Spark plug boot
22. Master Control lever
23. Fuel filler cap
24. Throttle trigger
25. Throttle trigger interlock
26. Rear handle
27. Rear hand guard

## TREE DISORDERS IDENTIFICATION LIST

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

STANDING TREE BOARD FOOT VOLUME TABLE

| <b>Table 2. Standing Tree Board Foot Volumes—International 1/4-Inch Rule</b> |                               |          |              |          |              |          |              |          |
|--|-------------------------------|----------|--------------|----------|--------------|----------|--------------|----------|
| <b>Dbh<br/>(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.