



12.013
9/24

Forestry

Purpose

The New Jersey 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 complete rules, policies and procedures relevant to all New Jersey FFA Career and Leadership Development Events may be found in the CDE & LDE Event Participation Policy: https://nj.gov/agriculture/ag_ed/ffa/activity/CDE_LDE_Policy.pdf

- 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.
- Participants are NOT allowed to use (or have visible) electronic devices during the event, unless for medical reasons or a portion of the event requires usage. This includes cell phones, tablets, etc. Participants will be allowed to use calculators, if specified for that event; however, cell phone calculators and graphing calculators are not permitted! **Failure to adhere to these rules will result in disqualification.**
- All individuals participating will judge in a cooperative manner following the rules set forth by the event coordinator.
- No school/chapter will use Rutgers University or Delaware Valley University facilities or locations for the training of teams. Contact with University faculty and staff is permissible. **Penalty will be disqualification.**
- This event will be scored using “Scan-tron” sheets. It is important for students to listen to directions and fill out the sheets correctly in order to receive credit. Sample scan-tron sheets are available for practice on the State Activity Guide. This event uses the Forestry scan-tron sheet.
- There will be no separate alternate teams.
- Travel Official Dress is required during the event. Travel Official Dress includes boots or work shoes, black jeans or work pants, etc. as opposed to dress attire. 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.
- A student may not compete in more than one event during the New Jersey FFA Fall Career Development Events.
- The State level competition fee of \$11 per contestant will be paid by the competing school. If a chapter is at least **blue** affiliated, registration to state FFA career development events is waived.

Event Format

EQUIPMENT

Materials to be provided by the student:

- Biltmore Stick
- Two no. 2 pencils
- Clipboard
- Calculator

Participants are not to bring:

- Cell phones or other electronic devices

EVENT SNAPSHOT

Below is a brief overview of the Forestry CDE:

This event consists of five (5) phases:

- Phase I – Team Activity - 150 points (30 minutes)
- Phase II – Written Exam – 100 points (30 minutes)
- Phase III – Tree Identification – 100 points (30 minutes)
- Phase IV – Practicum 1 – 100 points (30 minutes)
- Phase V – Practicum 2 – 100 points (30 minutes)

A chapter must have a team of four (4) for team awards. All four (4) scores are used in determining the team's rank.

Scantron will be used to score this event. At the end of this document is a sample of the sheet used, highlighting where to enter answers. You can get practice sheets here:

https://nj.gov/agriculture/ag_ed/ffa/activity/Scantron-Forestry.pdf

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.
- Each participant will be allowed 30 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.

Individual Practicums (100 points) each for total of 200 points per individual

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

- Tree Measurement – Timber Cruising for Board Volume
- Forest Management Evaluation (TSI)
- Equipment Identification
- Map Interpretation
- Compass
- Chainsaw Part Identification, Troubleshooting and Safety
- Tree/Forest Disorder
- Forest Products
- Forest Business Management Problem

The event coordinator will designate two practicums to be completed by the participant.

Each participant will have 30 minutes to complete each practicum.

TREE MEASUREMENT — TIMBER CRUISING FOR BOARD VOLUME

- 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 $\frac{1}{2}$ 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.

FOREST MANAGEMENT EVALUATION — TIMBER STAND IMPROVEMENTS (TSI) AND/OR THINNING PRACTICUM

- The trees selected and designated for use in this part of the event may be all of one species or a mixture of species.
- An area will be selected and identified by ribbons, paint, rope, etc. It will contain 20 marked trees within a timber stand. 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 in a multiple choice format:
 - (A) Harvest — utilize the tree.
 - (B) Leave — the tree should remain in stand for a good reason.
 - (C) 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.

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.

FOREST PRODUCTS PRACTICUM

Ten to 20 wood products/samples will be displayed for participants to evaluate and identify its tree species source from the tree identification specimen list. The wood products/samples will be presented in one or more of the following forms:

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

FOREST BUSINESS MANAGEMENT PROBLEM PRACTICUM

This section is designed to determine the participant's ability to apply economic principles and concepts of management to the decision-making process by actual problem analysis and to defend the decisions made. This will involve a model forest operation with possible calculation on profit/loss, cost of operation, taxes, depreciation, marketing product, stumpage cost, record keeping, etc.

A maximum of ten problems or questions will be used.

TEAM ACTIVITY

Forest Industry Scenario Team Activity (150 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. Thirty (30) minutes will be allowed to complete the activity. All supplies and materials needed to complete the task will be provided.

Scoring

Activities	Individual Points	Team Points
Written exam	100	400
Tree identification	100	400
Individual practicums – 2 selected * Tree Measurements/Timber Cruising * Timber Stand Improvement/Thinning (TSI) * Equipment Identification * Map Interpretation * Compass * Chainsaw Part Identification, Troubleshooting and Safety * Tree/Forest Disorders Identification * Forest Products Identification * Forest Business Mgmt.	200	800
Forestry industry scenario team activity		150
TOTAL	400	1,750

*denotes a hands-on practicum area

TIEBREAKERS

If ties occur, the following events will be used to determine award recipients:

TEAM

1. Written Exam
2. Tree Identification

INDIVIDUAL

1. Written Exam
2. Tree Identification

Awards

Awards will be presented to individuals and the first team based on their rankings at the CDE awards ceremony at the New Jersey State FFA Convention. Awards are sponsored by the New Jersey FFA Foundation, Inc., the New Jersey State FFA Association, and/or the National FFA Organization.

Individual

- Overall Medals
 - Medals – Top three individuals
- H.O. Sampson Certificates (hands-on practicum areas ONLY)
 - Certificate – Top five individuals

Team

- Plaque Sponsored by the National FFA Organization - 1st place

Awards will be presented to individuals and the first team based on their rankings at the CDE awards ceremony at the New Jersey State FFA Convention. The awards are sponsored by the National FFA Foundation and the New Jersey FFA Association.

The 1st place team will represent New Jersey at the National FFA Convention in October.

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

- Forests and Forestry. Rolfe et al., Interstate Publishers. 0-8134-3240-5.
- Introduction to Forestry Science. Burton, Delmar Publications. 0-8273-8010-0
- Science of Forestry Management. Irwin. AAVIM. Please call 706-742-5355 or email 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, <https://dendro.cnre.vt.edu/dendrology/factsheets.cfm>
- 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, https://www.srs.fs.usda.gov/pubs/misc/ag_654/table_of_contents.htm

TREE MEASUREMENT

- https://www.americanforests.org/wp-content/uploads/2014/12/AF-Tree-Measuring-Guidelines_LR.pdf
- <https://extension.okstate.edu/fact-sheets/print-publications/nrem/measuring-woodland-timber-nrem-5021.pdf>
- <https://www.extension.purdue.edu/extmedia/FNR/FNR-4.pdf>

FOREST MANAGEMENT

- Forests and Forestry. Rolfe et al., Interstate Publishers. 0-8134-3240-5.
- Introduction to Forestry Science. Burton, Delmar Publications. 0-8273-8010-0
- Science of Forestry Management. Irwin. AAVIM. . Please call 706-742-5355 or email 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.
- One Less Thing – Lessons, <https://www.onelessting.net/collections/lesson-plans>

EQUIPMENT IDENTIFICATION

- <https://www.forestry-suppliers.com/>
- <https://www.forestryequipmentguide.com/>

MAP INTERPRETATION

- The U.S. Department of Interior Geological Survey Topographic Map Information and Symbols Key, Map Distribution, U. S. Geological Survey. <https://pubs.usgs.gov/gip/TopographicMapSymbols/topomapsymbols.pdf>
- <https://www.honolulu.hawaii.edu/instruct/natsci/geology/brill2/TopoMaps.pdf>
- <https://paleoind.sitehost.iu.edu/Resources/Guide%20to%20Topographic%20Maps.pdf>
- <https://training.nwcg.gov/pre-courses/s290/S-290%20Student%20CD/Map%20and%20Compass.pdf>

COMPASS

- https://courses.washington.edu/esrm304a/lectures/LAB%201/RangerCompass_UserGuide.2000_2-up.pdf
- <https://training.nwcg.gov/pre-courses/s290/S-290%20Student%20CD/Map%20and%20Compass.pdf>

CHAINSAW PARTS AND IDENTIFICATION

- https://www.aces.edu/wp-content/uploads/2020/11/FOR-2084-ChainsawSafetyIMaintenance_111120aL-G.pdf
- <https://www.ctahr.hawaii.edu/oc/freepubs/pdf/res-092.pdf>
- https://www.stihl.com/p/media/download/uk-en/STIHL_Chain_Saw_Safety_Manual.pdf
- [https://fingerlakestrail.org/FLTC/BOM/REF/TrailManagementTeam/Maintenance/CHAINSAW%20MAINTENANCE%20--HOWDENSaw%20maintenance%20file\(1\).pdf](https://fingerlakestrail.org/FLTC/BOM/REF/TrailManagementTeam/Maintenance/CHAINSAW%20MAINTENANCE%20--HOWDENSaw%20maintenance%20file(1).pdf)

FOREST PRODUCTS

- <http://www.home-extension.co.uk/timber.pdf>
- <https://www.weyerhaeuser.com/woodproducts/>
- <https://www.octaneseating.com/types-of-wood-for-furniture>
- <https://www.columbiaforestproducts.com/resources/forestry/common-timber-resources/>
- <https://www.americanhardwood.org/en/american-hardwood>
- <https://woodidentification.net/softwood-species-descriptions/>

FOREST BUSINESS MANAGEMENT

- Forests and Forestry. Rolfe et al., Interstate Publishers. 0-8134-3240-5.
- Introduction to Forestry Science. Burton, Delmar Publications. 0-8273-8010-0
- Science of Forestry Management. Irwin. AAVIM. 0-8960-6383-6

Request for Reasonable Accommodations

The New Jersey FFA Association is committed to providing equal access to our events and activities for all people. Use this form to request a reasonable accommodation or assistance at least 3 weeks before any state-level events: <https://form.jotform.com/NJFFA/accommodations-request>. A new form will need to be submitted for each event in which a reasonable accommodation is being requested. This information will be kept confidential and will be used only to process the request. Our staff will review the request upon receipt and contact the requestor with additional information. The association cannot guarantee accommodations or assistance if a form is received less than 3 weeks before an event. Accommodations being requested that require the assistance of another person (nurse, interpreter, scribe, reader, etc.) is the responsibility of the school/requestor. It is also the school/requestor's responsibility to provide any approved equipment to aide in the accommodation process, if applicable.

Tree Identification List

01. Alder, Red (*Alnus rubra*)
02. Ash (*Fraxinus* sp.)
03. Aspen, Bigtooth (*Populus grandidentata*)
04. Aspen, Quaking (*Populus tremuloides*)
05. Baldcypress (*Taxodium distichum*)
06. Basswood (*Tili Americana*)
07. Beech, American (*Fagus americana*)
08. Birch, Black (*Betula lenta*)
09. Birch, White (*Betula papyrifera*)
10. Birch, Yellow (*Betula alleghaniensis*)
11. Cherry, Black (*Prunus serotina*)
12. Cottonwood, Eastern (*Populus deltoides*)
13. Elm (*Ulmus* sp.)
14. Fir, Balsam (*Abies balsamea*)
15. Fir, Douglas (*Pseudotsuga menziesii*)
16. Hackberry (*Celtis occidentalis*)
17. Hemlock, Eastern (*Tsuga canadensis*)
18. Hemlock, Western (*Tsuga heterophylla*)
19. Hickory (*Carya* sp.)
20. Larch (*Larix* sp.)
21. Maple, Red (*Acer rubrum*)
22. Maple, Sugar (*Acer saccharum*)
23. Oak, Black (*Quercus velutina*)
24. Oak, Chestnut (*Quercus montana*)
25. Oak, Northern Red (*Quercus rubra*)
26. Oak, Scarlet (*Quercus coccinea*)
27. Oak, Southern Red (*Quercus falcata*)
28. Oak, White (*Quercus alba*)
29. Pecan (*Carya illinoensis*)
30. Pine, Eastern White (*Pinus strobus*)
31. Pine, Loblolly (*Pinus taeda*)
32. Pine, Lodgepole (*Pinus contorta*)
33. Pine, Longleaf (*Pinus palustris*)
34. Pine, Ponderosa (*Pinus ponderosa*)
35. Pine, Red (*Pinus resinosa*)
36. Pine, Shortleaf (*Pinus echinata*)
37. Poplar, Yellow (*Liriodendron tulipifera*)
38. Red Cedar, Eastern (*Juniperus virginiana*)
39. Red Cedar, Western (*Thuja plicata*)
40. Sassafras (*Sassafras albidum*)
41. Spruce, Red (*Picea rubens*)
42. Spruce, Sitka (*Picea sitchensis*)
43. Spruce, White (*Picea glauca*)
44. Sweetgum (*Liquidambar styraciflua*)
45. Sycamore (*Platanus* sp.)
46. Walnut, Black (*Juglans nigra*)
47. Willow, Black (*Salix nigra*)

Equipment Identification List

01. Abney Level
02. Altimeter
03. Angle gauge
04. Ascender
05. Axe
06. Backpack Fire Pump
07. Bark Gauge
08. Bulldozer
09. Canthook
10. Carabiner
11. Chainsaw
12. Chainsaw Chaps
13. Chipper
14. Climbing Harness
15. Clinometer
16. Cruising Vest
17. Data Recorder
18. Densimeter
19. Delimber
20. Diameter Tape
21. Dot Grid
22. Drip Torch
23. Ear Protection
24. Endloader
25. Feller Buncher
26. Felling Wedge
27. Fiberglass Measuring Tape
28. Fire Rake
29. Fire Shelter
30. Fire Weather Kit
31. Fire-Swatter
32. First Aid Kit
33. Flow/current Meter
34. Foot Ascender
35. Gas Tank
36. GPS Receiver
37. Hand Compass
38. Hand Lens
39. Harvester
40. Hip Chain
41. Hypo-Hatchet
42. Increment Borer
43. Jacob Staff
44. Log Rule
45. Logger's Tape
46. Lopper
47. Maul
48. Peavy
49. pH Meter
50. Planimeter
51. Plant Press
52. Plastic Flagging
53. Pole Saw
54. Pruning Saw
55. Pulley
56. Relaskop
57. Safety Glasses
58. Safety Hard Hat
59. Scale Stick
60. Skidder
61. Staff compass
62. Stereoscope
63. Stump Grinder
64. Tally Book
65. Tally Meter
66. Timber Tongs
67. Tree Caliper
68. Tree Climbers
69. Tree Marking Gun
70. Tree Planting Hoe or Bar
71. Wedge Prism
72. Yarder

Tree Disorders Identification List

01. Aphid
02. Asian Longhorn Beetle
03. Black Knot
04. Butt or Heart Rot
05. Canker
06. Chemical Damage
07. Cicada
08. Climatic Injury (snow, wind, frost, drought, hail)
09. Damping Off
10. Douglas Fir Beetle
11. Dutch Elm Disease
12. Eastern Larch Beetle
13. Emerald Ash Borer
14. Fir Engraver Beetle
15. Fir Tussock Moth
16. Fire Damage
17. Hemlock Woolly Adelgid
18. Ips Engraver Beetle
19. Lightning Damage
20. Mechanical Damage
21. Mistletoe
22. Mountain Pine Beetle
23. Needle Cast
24. Nematode
25. Rust
26. Sawfly
27. Scale
28. Spongy Moth *Name change from Gypsy Moth
29. Spruce Beetle
30. Spruce Budworm
31. Sudden Oak Death
32. Sunscald
33. Tent Caterpillar
34. Western Pine Beetle
35. Wetwood or Slime Flux
36. Wildlife/Livestock Damage

Forest Products List

01. Alder (*Alnus* sp.)
02. Ash (*Fraxinus* sp.)
03. Aspen (*Populus* sp.)
04. Baldcypress (*Taxodium distichum*)
05. Basswood (*Tili americana*)
06. Beech, American (*Fagus Americana*)
07. Birch, Yellow (*Betula alleghaniensis*)
08. Cherry Black (*Prunus serotina*)
09. Cottonwood, Eastern (*Populus deltoides*)
10. Dimensional Lumber
11. Elm (*Ulmus* sp.)
12. Fir, Balsam (*Abies balsamea*)
13. Fir, Douglas (*Pseudotsuga menziesii*)
14. Glulam
15. Hackberry (*Celtis occidentalis*)
16. Hemlock (*Tsuga* sp.)
17. Hickory (*Cary asp.*)
18. Laminated Veneer Lumber
19. Larch (*Larix xp.*)
20. Maple, Hard (*Acer, sp.*)
21. Maple, Soft (*Acer, sp.*)
22. Medium Density Fiberboard (MDF)
23. Oak, Red (*Quercus rubra*)
24. Oak, White (*Quercus alba*)
25. Oriented Strand Board (OSB)
26. Particle Board
27. Pecan (*Carya illinoensis*)
28. Pine, Eastern White
29. Pine, Red
30. Pine, Southern Yellow
31. Pine, Western
32. Pole
33. Popular, Yellow (*Liriodendron tulipifera*)
34. Primed Boards
35. Plywood
36. Red Cedar, Eastern (*Juniperus virginiana*)
37. Red Cedar, Western (*Thuja plicata*)
38. Sassafras (*Sassafras albidum*)
39. Spruce, Eastern (*Picea rubens*)
40. Spruce, Sitka (*Picea sitchensis*)
41. Sweetgum (*Linquidambar styraciflua*)
42. Sycamore (*Platanus sp.*)
43. Tongue & Groove
44. Treated Lumber
45. Veneer
46. Walnut, Black (*Juglans nigra*)
47. Willow, Black (*Salix nigra*)

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			
TOTAL VOLUME			

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

Forestry - Form #: 530-3

Team Name / Additional Info

Incorrect Marks Correct Mark



Team #	State	Last Name	First Name
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
A	A	A	A
B	B	B	B
C	C	C	C
D	D	D	D
E	E	E	E
F	F	F	F
G	G	G	G
H	H	H	H
I	I	I	I
J	J	J	J
K	K	K	K
L	L	L	L
M	M	M	M
N	N	N	N
O	O	O	O
P	P	P	P
Q	Q	Q	Q
R	R	R	R
S	S	S	S
T	T	T	T
U	U	U	U
V	V	V	V
W	W	W	W
X	X	X	X
Y	Y	Y	Y
Z	Z	Z	Z

Code

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

Volume

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

Volume

dbh-10 H-10

dbh-9 H-9

dbh-8 H-8

dbh-7 H-7

dbh-6 H-6

dbh-5 H-5

dbh-4 H-4

dbh-3 H-3

dbh-2 H-2

dbh-1 H-1

Exam 1

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
8	A	B	C	D	E
9	A	B	C	D	E
10	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
16	A	B	C	D	E
17	A	B	C	D	E
18	A	B	C	D	E
19	A	B	C	D	E
20	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
26	A	B	C	D	E
27	A	B	C	D	E
28	A	B	C	D	E
29	A	B	C	D	E
30	A	B	C	D	E
31	A	B	C	D	E
32	A	B	C	D	E
33	A	B	C	D	E
34	A	B	C	D	E
35	A	B	C	D	E
36	A	B	C	D	E
37	A	B	C	D	E
38	A	B	C	D	E
39	A	B	C	D	E
40	A	B	C	D	E
41	A	B	C	D	E
42	A	B	C	D	E
43	A	B	C	D	E
44	A	B	C	D	E
45	A	B	C	D	E
46	A	B	C	D	E
47	A	B	C	D	E
48	A	B	C	D	E
49	A	B	C	D	E
50	A	B	C	D	E

Tree Identification

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

Volume Calculation Space

Practicum 1		
1	A B C D E	11 A B C D E
2	A B C D E	12 A B C D E
3	A B C D E	13 A B C D E
4	A B C D E	14 A B C D E
5	A B C D E	15 A B C D E
6	A B C D E	16 A B C D E
7	A B C D E	17 A B C D E
8	A B C D E	18 A B C D E
9	A B C D E	19 A B C D E
10	A B C D E	20 A B C D E
11	A B C D E	21 A B C D E
12	A B C D E	22 A B C D E
13	A B C D E	23 A B C D E
14	A B C D E	24 A B C D E
15	A B C D E	25 A B C D E
16	A B C D E	26 A B C D E
17	A B C D E	27 A B C D E
18	A B C D E	28 A B C D E
19	A B C D E	29 A B C D E
20	A B C D E	30 A B C D E

Practicum 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
6	A B C D E
7	A B C D E
8	A B C D E
9	A B C D E
10	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
16	A B C D E
17	A B C D E
18	A B C D E
19	A B C D E
20	A B C D E

Equipment Identification	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

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

Compass Practicum										
	1	2	3	4	5	6	7	8	9	10
	0	0	0	0	0	0	0	0	0	0
A	1	1	1	1	1	1	1	1	1	1
Z	2	2	2	2	2	2	2	2	2	2
I	3	3	3	3	3	3	3	3	3	3
M	4	4	4	4	4	4	4	4	4	4
U	5	5	5	5	5	5	5	5	5	5
T	6	6	6	6	6	6	6	6	6	6
H	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
	0	0	0	0	0	0	0	0	0	0
D	1	1	1	1	1	1	1	1	1	1
I	2	2	2	2	2	2	2	2	2	2
S	3	3	3	3	3	3	3	3	3	3
T	4	4	4	4	4	4	4	4	4	4
A	5	5	5	5	5	5	5	5	5	5
N	6	6	6	6	6	6	6	6	6	6
C	7	7	7	7	7	7	7	7	7	7
E	8	8	8	8	8	8	8	8	8	8
	9	9	9	9	9	9	9	9	9	9
	0	0	0	0	0	0	0	0	0	0

Agriculture, Food and Natural Resources Content Standards

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
ABS.01.01. Performance Indicator: Apply micro- and macroeconomic principles to plan and manage inputs and outputs in an AFNR business.		
ABS.01.01.01.c. Create strategies to maximize the efficiency of AFNR business inputs and outputs using microeconomic principles.	Forest business management problem practicum	CCSS.ELA-Literacy.L.9-10.6 CCSS.ELA-LITERACY.L.11-12.6 CCSS.ELA-LITERACY.RST.9-10.4 CCSS.ELA-LITERACY.RST.11-12.4 CCSS.MATH.CONTENT.HSS.ID.C.7 CCSS.MATH.CONTENT.HSS.IC.B.6 Financial Investing: Benchmarks: Grade 12, Statement 9
ABS.01.02. Performance Indicator: Read, interpret, evaluate and write statements of purpose to guide business goals, objectives and resource allocation.		
ABS.01.02.02.c. Evaluate AFNR business goals and objectives, then make revisions based on data and observations.	Forest business management problem practicum	CCSS.ELA-LITERACY.W.9-10.2 CCSS.ELA-LITERACY.W.11-12.2 CCSS.ELA-LITERACY.W.9-10.9 CCSS.ELA-LITERACY.W.11-12.9 CCSS.ELA-LITERACY.RI.9-10.4 CCSS.ELA-LITERACY.RI.11-12.4
ABS.01.03. Performance Indicator: Devise and apply management skills to organize and run an AFNR business in an efficient, legal and ethical manner.		
ABS.01.03.01.c. Devise strategies to improve the operation of AFNR businesses using management skills.	Forest business management problem practicum	CCSS.ELA-LITERACY.SL.9-10.6 CCSS.ELA-LITERACY.SL.11-12.6 CCSS.ELA-LITERACY.L.9-10.6 CCSS.ELA-LITERACY.L.11-12.6 CCSS.ELA-LITERACY.RST.9-10.4 CCSS.ELA-LITERACY.RST.11-12.4
ABS.01.03.02.c. Devise management or operational strategies to address and adhere to local, state, federal, international and industry regulations.	Forestry issues presentation team activity	CCSS.ELA-LITERACY.SL.9-10.6 CCSS.ELA-LITERACY.SL.11-12.6 CCSS.ELA-LITERACY.L.9-10.6 CCSS.ELA-LITERACY.L.11-12.6 CCSS.ELA-LITERACY.RST.9-10.4 CCSS.ELA-LITERACY.RST.11-12.4
ABS.04.02. Performance Indicator: Develop production and operational plans for an AFNR business.		
ABS.04.02.01.c. Make recommendations to improve operational plans for an AFNR business based on best practices.	Forest business management problem practicum Forestry issues presentation team activity	AFNR Career Cluster – Agribusiness Systems Pathway, Statement 3 CCSS.ELA-LITERACY.ELA-W.9-10.2 CCSS.ELA-LITERACY.W.11-12.2 CCSS.ELA-LITERACY.L.9-10.6 CCSS.ELA-LITERACY.L.11-12.6 CCSS.ELA-LITERACY.RST.9-10.4 CCSS.ELA-LITERACY.RST.11-12.4
ABS.05.01. Performance Indicator: Analyze the role of markets, trade, competition and price in relation to an AFNR business sales and marketing plans.		
ABS.05.01.01.c. Evaluate and predict future trends for a specific AFNR product as related to markets, trade and price (e.g., corn, oil, wheat, etc.).	Forestry issues presentation team activity	AFNR Career Cluster, Statement 7 AFNR Career Cluster – Agribusiness Systems Pathway, Statement 1 Financial Investing: Benchmarks: Grade 12, Statement 13

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
CS.01.01. Performance Indicator: Examine issues and trends that impact AFNR systems on local, state, national and global levels.		
CS.01.01.01.c. Evaluate and explain AFNR issues and their impacts to audiences with limited AFNR knowledge.	Forestry issues presentation team activity	
CS.01.01.02.c. Evaluate emerging trends and the opportunities they may create within the AFNR systems.	Forestry issues presentation team activity	
CS.01.03. Performance Indicator: Identify public policies and their impact on AFNR systems.		
CS.01.03.01.c. Evaluate a public policy within AFNR systems and defend or challenge it.	Forestry issues presentation team activity	
CS.02.01. Performance Indicator: Research geographic and economic data related to AFNR systems.		
CS.02.01.02.c. Devise a strategy to solve a problem in an AFNR system using a set of economic data.	Forestry issues presentation team activity	
CS.02.02. Performance Indicator: Examine the components of the AFNR systems and their impact on the local, state, national and global society and economy.		
CS.02.02.01.c. Devise a strategy for explaining components of AFNR systems to audiences with limited knowledge.	Forestry issues presentation team activity	
CS.02.02.02.c. Evaluate how society traditions, customs or policies have resulted from practices with AFNR systems.	Forestry issues presentation team activity	
CS.02.02.03.c. Evaluate how positive or negative changes in the local, state, national or global economy impacts AFNR systems.	Forestry issues presentation team activity	
CS.03.04. Performance Indicator: Use appropriate protective equipment and demonstrate safe and proper use of AFNR tools and equipment.		
CS.03.04.01.a. Identify and differentiate the appropriate protective equipment for the safe use and operation of specific tools and	Chainsaw part identification Troubleshooting and safety practicum	
CS.03.04.02.a. Identify standard tools, equipment and safety procedures related to AFNR tasks.	Chainsaw part identification Troubleshooting and safety practicum	
CS.03.04.02.b. Complete the set up and adjustment for tools and equipment related to AFNR tasks.	Chainsaw part identification Troubleshooting and safety practicum	
C3.06.04.02.c. Evaluate and select appropriate tools and equipment to complete AFNR tasks.	Chainsaw part identification Troubleshooting and safety practicum	
CS.03.04.03.a. Read and interpret operating instructions related to operation, storage and maintenance of tools and equipment related AFNR tasks.	Chainsaw part identification Troubleshooting and safety practicum	
CS.03.04.03.b. Assess and demonstrate appropriate operation, storage and maintenance techniques for AFNR tools and equipment.	Chainsaw part identification Troubleshooting and safety practicum	
CS.04.01. Performance Indicator: Identify and implement practices to steward natural resources in different AFNR systems.		
CS.04.01.01.b. Analyze available practices to steward natural resources in AFNR systems (e.g., wildlife and land conservation, soil and water practices, ecosystem management, etc.).	Forest business management problem practicum TSI practicum	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3
CS.04.01.02.b. Analyze and assess sustainability practices that can be applied in AFNR systems (e.g., energy efficiency, recycle/reuse/repurpose, green resources, etc.).	Forestry issues presentation team activity	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
CS.04.02. Performance Indicator: Assess the natural resource related trends, technologies and policies that impact AFNR systems.		
CS.04.02.01.b. Analyze natural resources trends and technologies and document how they impact AFNR systems (e.g., climate change, green technologies, water resources, etc.).	Forestry Issues presentation team activity	AFNR Career Cluster, Statement 7
CS.05.01. Performance Indicator: Evaluate the steps and requirements to pursue a career opportunity in each of the AFNR career pathways (e.g., goals, degrees, certifications, resumes, cover letter, portfolios, interviews, etc.).		
CS.05.01.01.a. Identify and summarize the steps to pursue a career in an AFNR pathway (e.g., self-assessment, set goals, etc.).	General knowledge exam	
CS.05.01.02.a. Examine the educational, training and experiential requirements to pursue a career in an AFNR pathway (e.g., degrees, certifications, training, internships, etc.).	Entire event	
CS.05.01.03.a. Research and summarize specific tools (e.g., resumes, portfolios, cover letters, etc.) and processes (e.g., interviews, applications, etc.) needed to pursue a career in an AFNR pathway.	Entire event	
CS.06.01. Performance Indicator: Explain foundational cycles and systems of AFNR.		
CS.06.01.01.b. Analyze how foundational cycles affect production, processing and management of food, fiber and fuel.	General knowledge exam	
ESS.01.01. Performance Indicator: Analyze and interpret laboratory and field samples in environmental service systems.		
ESS.01.01.01.c. Collect and prepare sample measurements using appropriate data collection techniques.	Compass practicum Tree measurement — timber cruising for board volume	CCSS.ELA-LITERACY.SL.11-12.5 CCSS.ELA-LITERACY.RST.11-12.9 CCSS.MATH.CONTENT.HSN.Q.A.1 CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3 CCSS.MATH.CONTENT.HSS.ID.A.2 CCSS.MATH.CONTENT.HSS.ID.B.5 HS-ESS2-2
ESS.01.01.02.c. Utilize data analysis to identify trends in a data sample and assess the confidence that can be drawn from those conclusions.	Forest business management problem practicum	CCSS.ELA-LITERACY.SL.11-12.5 CCSS.ELA-LITERACY.RST.11-12.9 CCSS.MATH.CONTENT.HSN.Q.A.1 CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3 CCSS.MATH.CONTENT.HSS.ID.A.2 CCSS.MATH.CONTENT.HSS.ID.B.5 HS-ESS2-2
ESS.01.02. Performance Indicator: Properly utilize scientific instruments in environmental monitoring situations (e.g., laboratory equipment, environmental monitoring instruments, etc.).		
ESS.01.02.01.a. Identify basic laboratory equipment and explain their uses.	Equipment identification practicum	
ESS.01.02.02.a. Identify basic environmental monitoring instruments and explain their uses.	Equipment identification practicum	

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
ESS.05.01. Performance Indicator: Use technological and mathematical tools to map land, facilities and infrastructure for environmental service systems.		
ESS.05.01.01.c. Demonstrate surveying and cartographic skills to make site measurements in order to address concerns and needs within an environmental service systems situation.	Compass practicum Map interpretation practicum	HS-ETS1-4
NRS.01.01. Performance Indicator: Apply methods of classification to examine natural resource availability and ecosystem function in a particular region.		
NRS.01.01.01.c. Devise strategies for the preservation of natural resources based on their classification.	Forest business management problem practicum	AFNR Career Cluster, Statement 1 AFNR Career Cluster, Statement 2 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3 STEM Career Cluster, Statement 1 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.2 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.9-10.9 CCSS.ELA-LITERACY.WHST.11-12.9
NRS.01.02. Performance Indicator: Classify different types of natural resources in order to enable protection, conservation, enhancement and management in a particular geographical region.		
NRS.01.02.01.b. Apply identification techniques to determine the species of a tree or woody plant.	Tree identification Tree/Forest disorders practicum	AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.2 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.9-10.7 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.9-10.9 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.MATH.CONTENT.HSN-Q.A.1 CCSS.MATH.CONTENT.HSN-Q.A.2 HS-ESS3-2
NRS.01.02.01.c. Evaluate the species of trees present to assess the health of an ecosystem (e.g., presence of native versus invasive species, biodiversity, etc.).	Forestry Issues presentation team activity	AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.2 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.9-10.7 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.9-10.9 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.MATH.CONTENT.HSN-Q.A.1 CCSS.MATH.CONTENT.HSN-Q.A.2 HS-ESS3-2
NRS.01.02.02.b. Apply identification techniques to determine the species of an herbaceous plant.	Tree/Forest disorders practicum	AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.7

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
		CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.2 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.9-10.7 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.9-10.9 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.MATH.CONTENT.HSN-Q.A.1 CCSS.MATH.CONTENT.HSN-Q.A.2 HS-ESS3-2
NRS.01.02.03.b. Apply identification techniques to determine the species of wildlife or insect.	Tree/Forest disorders practicum	AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.2 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.9-10.7 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.9-10.9 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.MATH.CONTENT.HSN-Q.A.1 CCSS.MATH.CONTENT.HSN-Q.A.2 HS-ESS3-2
NRS.01.02.06.c. Conduct an assessment of the resource inventories or population in a given area.	Forest business management problem practicum Tree measurement — timber cruising for board volume	AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.2 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.9-10.7 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.9-10.9 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.MATH.CONTENT.HSN-Q.A.1 CCSS.MATH.CONTENT.HSN-Q.A.2 HS-ESS3-2
NRS.01.05. Performance Indicator: Apply ecological concepts and principles to terrestrial natural resource systems.		
NRS.01.05.01.b. Analyze and summarize examples of stages of succession.	General knowledge exam	AFNR Career Cluster, Statement 1 AFNR Career Cluster – Animal Systems Pathway, Statement 3 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.MATH.CONTENT.HSS-ID.A.1 CCSS.MATH.CONTENT.HSS-IC.A.1 CCSS.MATH.CONTENT.HSS-IC.B.6 HS-ESS3-4 HS-ESS3-2

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
<p>NRS.01.05.03.c. Devise a forest management plan that improves the habitat while sustainably maximizing the amount of timber that can be harvested.</p>	<p>Forest business management problem practicum</p>	<p>AFNR Career Cluster, Statement 1 AFNR Career Cluster – Animal Systems Pathway, Statement 3 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.MATH.CONTENT.HSS-ID.A.1 CCSS.MATH.CONTENT.HSS-IC.A.1 CCSS.MATH.CONTENT.HSS-IC.B.6 HS-ESS3-4 HS-ESS3-2</p>
<p>NRS.01.06. Performance Indicator: Apply ecological concepts and principles to living organisms in natural resource systems.</p>		
<p>NRS.01.06.02.b. Analyze factors that influence the establishment and spread of invasive species and determine the appropriate steps to prevent or minimize the impact of invasive species.</p>	<p>Forestry issues presentation team activity</p>	<p>AFNR Career Cluster, Statement 1 AFNR Career Cluster – Animal Systems Pathway, Statement 3 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.2 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.9-10.5 CCSS.ELA-LITERACY.WHST.11-12.5 CCSS.ELA-LITERACY.WHST.9-10.7 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.9-10.9 CCSS.ELA-LITERACY.WHST.11-12.9 HS-LS4-4 HS-LS4-6 HS-ESS3-4</p>
<p>NRS.02.04. Performance Indicator: Examine and explain how economics affects the use of natural resources.</p>		
<p>NRS.02.04.01.a. Compare and contrast how the economic value of a natural resource affects its availability.</p>	<p>Forestry issues presentation team activity</p>	<p>AFNR Career Cluster, Statement 4 AFNR Career Cluster – Agribusiness Systems Pathway, Statement 4 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 4 AFNR Career Cluster – Plant Systems Pathway, Statement 1 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.8 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.ELA-LITERACY.SL.11-12.4 HS-ESS3-2</p>
<p>NRS.02.04.02.b. Assess the importance of the use of natural resources on local, state and national economies.</p>	<p>Forestry issues presentation team activity</p>	<p>AFNR Career Cluster, Statement 4 AFNR Career Cluster – Agribusiness Systems Pathway, Statement 4</p>

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
		AFNR Career Cluster – Natural Resources Systems Pathway, Statement 4 AFNR Career Cluster – Plant Systems Pathway, Statement 1 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.8 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.ELA-LITERACY.SL.11-12.4 HS-ESS3-2
NRS.02.04.03.a. Compare and contrast the economic impact of green technology and alternative energy.	Forestry issues presentation team activity	AFNR Career Cluster, Statement 4 AFNR Career Cluster – Agribusiness Systems Pathway, Statement 4 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 4 AFNR Career Cluster – Plant Systems Pathway, Statement 1 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.8 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.ELA-LITERACY.SL.11-12.4 HS-ESS3-2
NRS.02.04.03.b. Analyze and document how the adoption of green technology and/or alternative energy affected a local, state or national economy.	Forestry issues presentation team activity	AFNR Career Cluster, Statement 4 AFNR Career Cluster – Agribusiness Systems Pathway, Statement 4 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 4 AFNR Career Cluster – Plant Systems Pathway, Statement 1 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.8 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.ELA-LITERACY.SL.11-12.4 HS-ESS3-2
NRS.02.05. Performance Indicator: Communicate information to the public regarding topics related to the management, protection, enhancement, and improvement of natural resources.		
NRS.02.05.02.a. Research how social media and the Internet have changed how people perceive and utilize natural resources (e.g., greater awareness of conservation issues, calls to action, etc.).	Forestry issues presentation team activity	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3 STEM Career Cluster, Statement 2 STEM Career Cluster, Statement 3

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
NRS.02.05.03.a. Examine how communication can be used to influence behavior, call people to action and instill a sense of civic behavior related to the conservation, management, enhancement and improvement of natural resources.	Forestry issues presentation team activity	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3 STEM Career Cluster, Statement 2 STEM Career Cluster, Statement 3
NRS.03.01. Performance Indicator: Sustainably produce, harvest, process and use natural resource products (e.g., forest products, wildlife, minerals, fossil fuels, shale oil, alternative energy, recreation, aquatic species, etc.).		
NRS.03.01.01.c. Develop a forest harvesting plan that ensures economic, environmental and social sustainability.	Forest business management problem practicum	AFNR Career Cluster – Food Products and Processing Systems Pathway, Statement 1 AFNR Career Cluster – Plant Systems Pathway, Statement 4 CCSS.ELA-LITERACY.RST.11-12.8 HS-ESS3-2 HS-ESS3-3
NRS.03.01.07.a. Research how recreational uses of natural resources can be changed to improve sustainability.	Forestry issues presentation team activity	AFNR Career Cluster – Food Products and Processing Systems Pathway, Statement 1 AFNR Career Cluster – Plant Systems Pathway, Statement 4 CCSS.ELA-LITERACY.RST.11-12.8 HS-ESS3-2 HS-ESS3-3
NRS.03.02. Performance Indicator: Demonstrate cartographic skills, tools and technologies to aid in developing, implementing and evaluating natural resource management plans.		
NRS.03.02.01.a. Summarize how to use maps to identify directions and land features, calculate actual distance and determine the elevations of points.	Map interpretation practicum	
NRS.04.01. Performance Indicator: Demonstrate natural resource protection, maintenance, enhancement and improvement techniques.		
NRS.04.01.02.c. Create a timber stand improvement plan for a forest.	Forest business management problem practicum	AFNR Career Cluster – Environmental Service Systems Pathway, Statement 3 AFNR Career Cluster – Environmental Service Systems Pathway, Statement 4 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 5 AFNR Career Cluster – Plant Systems Pathway, Statement 2 AFNR Career Cluster – Plant Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.SL.11-12.4 HS-ESS3-2 HS-ESS3-3 HS-ESS3-4
NRS.04.02. Performance Indicator: Diagnose plant and wildlife diseases and follow protocols to prevent their spread.		
NRS.04.02.01.a. Classify causes of diseases in plants and the correct authorities to whom some diseases should be reported.	Tree/Forest disorders practicum	CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.8 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.MATH.CONTENT.HSN-Q.A.1

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
		CCSS.MATH.CONTENT.HSN-Q.A.2 CCSS.MATH.CONTENT.HSN-Q.A.3 HS-LS2-7
NRS.04.03. Performance Indicator: Prevent or manage introduction of ecologically harmful species in a particular region.		
NRS.04.03.01.a. Categorize harmful and beneficial insects, as well as signs of insect damage to natural resources.	Tree/Forest disorders practicum	CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.5 CCSS.ELA-LITERACY.WHST.11-12.5 CCSS.ELA-LITERACY.WHST.9-10.7 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.MATH.CONTENT.HSN-Q.A.1 CCSS.MATH.CONTENT.HSN-Q.A.2 CCSS.MATH.CONTENT.HSN-Q.A.3 CCSS.MATH.CONTENT.HSS-ID.A.1 CCSS.MATH.CONTENT.HSS-IC.A.1 CCSS.MATH.CONTENT.HSS-IC.B.6 HS-LS2-7 HS-LS4-6
NRS.04.04. Performance Indicator: Manage fires in natural resource systems.		
NRS.04.04.01.b. Assess techniques used to fight wildfires, manage prescribed fires and ensure human safety.	General knowledge exam	
PS.02.02. Performance Indicator: Apply knowledge of plant anatomy and the functions of plant structures to activities associated with plant systems.		
PS.02.02.03.a. Identify and summarize the components and the functions of plant stems.	General knowledge exam	HS-LS1-4
PS.02.02.04.a. Research and summarize leaf morphology and the functions of leaves.	General knowledge exam	HS-LS1-4
PS.03.03. Performance Indicator: Develop and implement a plan for integrated pest management for plant production.		
PS.03.03.01.b. Identify and analyze major local weeds, insect pests and infectious and noninfectious plant diseases.	Tree/Forest disorders practicum	
PST.01.01. Performance Indicator: Apply physical science and engineering principles to assess and select energy sources for AFNR power, structural and technical systems.		
PST.01.01.01.a. Research and identify renewable and nonrenewable energy sources used in AFNR.	Forestry issues presentation team activity	AFNR Career Cluster, Statement 4 AFNR Career Cluster, Statement 5 HS-ESS3-3 HS-PS3-3
PST.01.02. Performance Indicator: Apply physical science and engineering principles to design, implement and improve safe and efficient mechanical systems in AFNR situations.		
PST.01.02.03.c. Conduct a safety inspection of tools, machines and equipment used in different AFNR related mechanical systems.	Chainsaw part identification	HS-PS3-1 HS-PS3-3