



Virginia FFA Nursery/Landscape

Purpose

The purpose of the National FFA Nursery/Landscape Career Development Event is to promote career interest, encourage proficiency development and recognize excellence in participants of the event which includes all aspects of the industry to produce, market, utilize and maintain landscape plants (woody and herbaceous plants and turf grasses), as well as related production and landscaping products, equipment and services including design.

Objectives

Participants in the nursery/landscape CDE will be able to utilize the skills specific to each of the following categories:

- **Nursery/Landscape Principles:** Apply nursery and landscape principles and practices as they impact residential, commercial, public and recreational applications.
- **Plant Materials:** Demonstrate the ability to identify, select and utilize nursery and landscape plants (interior/exterior), landscape materials and turf grasses commonly used in the United States.
- **Plant Disorders:** Demonstrate the ability to identify unhealthy plant conditions due to pests, nutritional/physiological disorders and mechanical/chemical injury.
- **Cultural Practices:** Demonstrate knowledge of the principles and skills involved in propagation, growth requirements, growing techniques, harvesting, sustainability, marketing, and maintenance of interior and exterior landscape plants and turf grasses.
- **Design and Construction:** Demonstrate knowledge of the principles and techniques of landscape design, estimating and construction.
- **Supplies and Equipment:** Demonstrate the ability to identify, select, use and maintain appropriate supplies and equipment for nursery and landscape operations, including equipment and procedures in mechanization and automation.
- **Safety:** Demonstrate knowledge of safety practices in nursery and landscape operations.
- **Interpersonal Relations:** Demonstrate skills in oral business communications.
- **Business Management:** Demonstrate an understanding of marketing principles and business management as well as proper sales and service skills.
- **Records and Reports:** Demonstrate the ability to prepare estimates and complete financial statements.

Event Rules

- A team is comprised of 4 members. All 4 scores count toward the team total.
- It is highly recommended that participants wear **official dress**.
- Coaches may accompany participants to the event site but must leave the area at the start of the event. At the conclusion of all event components, the superintendent will announce when participants, visitors and coaches may enter the competition area to review the materials and organization.
- Under no circumstances will any participant be allowed to touch or handle plant materials or other specimens during the event except as expressly permitted in practicums.

Event Format

Each participant must have the following individual tools for the competition:

- A clean clipboard
- At least two No. 2 pencils
- A ball-point or felt-tip pen
- A calculator — Calculators used in this event should be battery-operated, nonprogrammable and silent with large keys and displays. Calculator functions should be limited to: addition, subtraction, multiplication, division, equals, percent, square root, +/- key and one memory register. No other calculators may be used during the event.
- An architect's scale
- An engineer's scale
- ~~Additional items allowed, but not required, include the following:~~
 - ~~A hand pruner or knife.~~

INDIVIDUAL EVENTS

Phase 1: General Knowledge Examination (150 points per contestant)

Objective questions will be prepared on topics reflecting subject areas in the objectives. This phase will evaluate the participant's knowledge and understanding of basic horticultural principles in producing, marketing, using and maintaining landscape plants and turf. Participants will record their answers on a scan form.

Phase 2: Identification of Plants, Pests, Disorders, and Beneficial Insect (140 points per contestant)

Participants will identify items selected from the provided list covering the following categories:

- Plant materials will be presented as intact, live specimens, photos, plant parts or any combination.
- Pests and disorders will be presented as a damaged specimen, photograph or preserved specimen, herbarium sheet, insect mount, etc. A "disorder" label will be with an item to designate identification of a problem rather than the plant.
- Beneficial insects and other organisms that benefit the landscape by feeding on harmful organisms.

Each specimen will be designated by a station number. When the participant identifies the item, its name is then located on the identification list. The participant then records the number by that name on a scan form at the respective station number.

Each participant will be provided a copy of the list at the event site. No specimens or items may be touched or handled in any way.

Phase 3: Landscape Estimating (100 points per contestant)

This practicum is designed to evaluate participant knowledge of and ability in the following areas:

- Evaluating a landscape design
- Reading a landscape drawing
- Determining materials needed to execute a landscape plan
- Maintenance, estimating and bidding
- Evaluating factors that affect profitability of a landscape business

A landscape drawing and scratch paper will be provided to the participants. There will be objective questions about the landscape plan. Participants will record their answers using a scan form.

Phase Nursery Propagation or Potting (50 points per contestant)

- This practicum evaluates participant knowledge of and ability in performing fundamental nursery production practices. All participants will perform one of the following exercises. The selected exercise will not be announced prior to the start of the event.
- **Propagating Nursery Stock:** Each participant will be furnished with a stock plant or stock plant material, rooting flat and media, rooting hormone, a hand pruner, a label and marking pen. Personal propagating knives or pruners are allowed. Participants are to prepare the cuttings and place them in the media with a single label.
- **Potting Nursery Stock:** Each participant will be furnished with a supply of plants, nursery containers of appropriate size and growing media. Hand pruners, a label and a marking pen will also be provided. Personal pruners are allowed. The participants will pot the plants, one per container, using standard nursery practices. Plant division or grading of liners may be involved. One finished container will be labeled.

An official will observe and score each participant during the practicum. Following completion of the assigned practicum, the official will ask questions regarding the propagation or potting activity. Scoring criteria are listed on the respective scorecards.

Scoring

Participant scores are the sum of the ~~five~~ individual phases of the event. Team scores are the sum of all members scores plus the group portion of the team skills challenge. Possible points are as follows:

Phase	Individual Points	Team Points
1. General knowledge exam	150	600
2. Identification	140	560
3. Landscape estimating	100	400
4. Verbal customer assistance	50	200
5. Nursery propagation/potting	50	200
6. Team Skills Challenge		400
o Team Cooperation		50
POINT TOTALS	390	1560

**Strike Through =
National Contest
ONLY

TIEBREAKERS

If needed in the case of ties, final placings will be determined by comparing, in order, scores for the following:

Individuals

- General knowledge exam
- Identification
- Landscape estimating

Team

- Team general knowledge exam score

Awards

Awards will be presented to individuals and teams at the awards ceremony based on their rankings.

References

The following list of references is a guide to team training and is not meant to be all-inclusive.

Some content areas have more than one title listed. This reflects the wide array of quality references available for this event. No single reference is recommended as superior over others in that area. Multiple references are desirable as no single source is comprehensive for the entire nursery/landscape CDE. References other than those listed may be equally valuable resources, along with the many video and computer-based training aids available.

- Nursery/Landscape CDE materials, shop.FFA.org
- Past CDE materials and other resources are available on FFA.org.

GENERAL REFERENCES

- Introduction to Horticulture. (Current edition.) Charles B. Schroeder, Eddie Dean Seagle, Lorrie M. Felton, John M. Ruter, William Terry Kell, and Gerard Krewer. Prentice-Hall, Inc., Englewood Cliffs, N.J. ISBN 0130364134
- Introductory Horticulture. (Current edition.) H. Edward Reiley and Carroll L. Shry, Jr. Clifton Park, N.Y.: Delmar Cengage Learning. ISBN 9781435480391
- Ornamental Horticulture. Current edition. Jack Ingels. Delmar Publishers Inc., Albany, N.Y. ISBN-13: 9781435498167
- Introduction to Plant and Soil Science and Technology. (Current edition.) Ronald J. Biondo and Jasper S. Lee. Prentice-Hall, Inc., Englewood Cliffs, N.J. ISBN 0813432162

LANDSCAPE

- Landscaping Principles and Practices. (Current edition.) Jack Ingels. Delmar Publishers Inc., Albany, N.Y. ISBN 13: 9781428376410
- Landscaping Construction. (Current edition.) David Sauter. Delmar Publishers Inc., Albany, N.Y. ISBN 143549718X
- Introduction to Landscaping: Design, Construction, and Maintenance. (Current edition.) Ronald J. Biondo and Charles B. Schroeder. Prentice-Hall, Inc., Englewood Cliffs, N.J. ISBN 0133626385
- Landscape Training Manuals for Installation, Irrigation, and Maintenance Technicians. (Current edition.) National Association of Landscape Professionals, 950 Herndon Pkwy, Suite 450, Herndon, Va. 20170, https://www.landscapeprofessionals.org/LP/Store/AllBooks/SET_0050.aspx

TURF

- Turfgrass Science and Management. (Current edition.) Robert D. Emmons. Delmar Publishers Inc., Albany, N.Y. ISBN 10: 1418013307
- Turfgrass Management. (Current edition.) A.J. Turgeon. Prentice-Hall, Inc. Boston. ISBN 0137074352

NURSERY

- Plant Propagation: Principles and Practices. (Current edition.) Hudson T. Hartmann, Fred T. Davies, Jr., Dale E. Kester, and Robert L. Genieve. Prentice Hall, Boston. ISBN 0135014492
- American Standard for Nursery Stock. (Current edition.) American Association of Nurserymen, Inc., 1250 I St., NE, Suite 500, Washington, DC. (available as a pdf file free to nonmembers at <https://www.americanhort.org/education/american-nursery-stock-standards/>)

SECONDARY REFERENCES

- Practical Horticulture. (Current edition.) Laura W. Rice and Robert P. Rice. Prentice-Hall, Inc., Englewood Cliffs, N.J. ISBN 0135038669

- Landscape Design: A Practical Approach. (Current edition.) Leroy G. Hannebaum. PrenticeHall, Inc., Upper Saddle River, N.J. ISBN 0130105813
- Manual of Woody Landscape Plants. (Current edition.) Michael A. Dirr. Stipes Publishing Co., Champaign, Ill. ISBN 978-1-58874-868-3
- A Field Guide to Woody Landscape Plants of the Southeast. (Current edition.) Rex Bishop. Tea Olive Productions. Marietta, Ga. ISBN 097253430X
- Nursery Management: Administration and Culture. (Current edition.) Harold Davidson, Roy Mecklenburg, and Curtis Peterson. Prentice-Hall, Upper Saddle River, N.J. ISBN 0138579962
- Landscape Plants, Their Identification, Culture, and Use. (Current edition.) Ferrell M. Bridwell. Delmar Thomson Learning, Albany, N.Y. ISBN 0766836347
- Know It and Grow It III: A Guide to the Identification and Use of Landscape Plants. (Current edition.) Carl E. Whitcomb. Lacebark, Inc. Stillwater, Okla. ISBN 0961310910
- Manual of Herbaceous Ornamental Plants. (Current edition.) Steven M. Still. Stipes Publishing Co., Champaign, Ill. ISBN 0-87563-433-8.
- Herbaceous Perennial Plants: A Treatise on Their Identification, Culture, and Garden Attributes. (Current edition.) Allan M. Armitage, Stipes Publishing Co., Champaign, Ill. ISBN 978-1-58874-868-3.
- Landscape Construction Procedures, Techniques, and Design. (Current edition.) Floyd Giles. Stipes Publishing Co., Champaign, Ill. ISBN 0875638848
- The Turf Problem Solver: Case Studies and Solutions for Environmental, Cultural, and Pest Problems. (Current edition.) A.J. Turgeon and J.M. Vargas, Jr. J. Wiley, Hoboken, N.J. ISBN 9780471736196.

TRADE PERIODICALS

1. American Nurseryman. American Nurserymen Publishing Co., Chicago, Ill., <http://www.amerinursery.com/>
2. Turf Magazine plus several other on-line titles. Moose River Media LLC., www.turfmagazine.com/

INDUSTRY CATALOGS

1. Many horticultural supply company catalogs can be utilized for reference support on tools, equipment and supplies that may not be illustrated in other sources.
2. A.M. Leonard, Inc., 665 Spiker Road, Piqua, OH 45356 (513/773-2697 or <https://www.amleo.com/>)
3. Hummert International, 4500 Earth City Expressway, Earth City, Mo. 63045, 800-325-3055, <https://www.hummert.com>

WEBSITES AND PROBLEM SAMPLES

Additional links and resources will be included as they are developed or identified, along with the following links of the CDE sponsors:

- <http://www.stihlusa.com/information/>
- <http://www.kubota.com>
- <http://www.arysta-na.com>
- <http://www.treefund.org>
- <https://www.landscapeprofessionals.org/>

Nursery/Landscape Plant Identification – 2023

No.	Botanical Name	Common Name
101	<i>Abelia x grandiflora</i> cv.	Glossy Abelia
102	<i>Acer palmatum</i> cv.	Japanese Maple
103	<i>Acer rubrum</i> cv.	Red Maple
104	<i>Acer saccharum</i> cv.	Sugar Maple
105	<i>Aglaonema commutatum</i>	'Chinese Evergreen'
106	<i>Ajuga reptans</i> cv.	Carpet Bugle
107	<i>Amelanchier arborea</i>	Downy Serviceberry
108	<i>Aquilegia x hybrida</i> cv.	Columbine
109	<i>Astilbe hybrid</i> cv.	Astilbe
110	<i>Begonia semperflorens-cultorum</i>	Wax Begonia
111	<i>Berberis x mentorensis</i>	Mentor Barberry
112	<i>Betula nigra</i>	River Birch
113	<i>Buddleia davidii</i> cv.	Butterfly Bush
114	<i>Buxus microphylla</i> cv.	Littleleaf Boxwood
115	<i>Camellia japonica</i> cv.	Common Camellia
116	<i>Cedrus atlantica</i> 'Glauc'	Blue Atlas Cedar
117	<i>Cercis canadensis</i>	Redbud
118	<i>Chaenomeles speciosa</i> cv.	Japanese (Flowering) Quince
119	<i>Clematis hybrid</i>	Clematis
120	<i>Cornus florida</i> cv.	Flowering Dogwood
121	<i>Cotoneaster dammeri</i>	Bearberry Cotoneaster
122	<i>Crataegus phaenopyrum</i>	Washington Hawthorn
123	<i>Cynodon dactylon</i> cv	Bermudagrass
124	<i>Dieffenbachia maculata</i> cv.	Spotted Dumb Cane
125	<i>Dracaena deremensis</i> 'Warneckii'	Striped Dracaena
126	<i>Dracaena fragens</i> 'Massangeana'	Corn Plant
127	<i>Echinaceae purpurea</i>	Purple Coneflower
128	<i>Epipremnum</i> spp.	Pothos
129	<i>Euonymus alatus</i>	Winged Euonymus
130	<i>Euonymus fortunei</i> cv.	Wintercreeper
131	<i>Festuca</i> spp. and cv.	Fescue
132	<i>Ficus benjamina</i>	Benjamin Fig
133	<i>Ficus elastica</i> 'Decora'	Decora Rubber Plant

No.	Botanical Name	Common Name
134	<i>Forsythia x intermedia</i> cv.	Border Forsythia
135	<i>Gaillardia aristata</i> cv.	Common Blanketflower
136	<i>Gardenia jasminoides</i> cv.	Gardenia
137	<i>Ginkgo biloba</i>	Ginkgo, Maidenhair Tree
138	<i>Gleditsia triacanthos inermis</i> cv.	Thornless Honeylocust
139	<i>Hedera helix</i> cv.	English Ivy
140	<i>Hellaborus orientalis</i> cv.	Lenten Rose
141	<i>Heemerocallis</i> spp. and cv.	Day lily
142	<i>Heuchera</i> cv.	Coral Bells, Alumroot
143	<i>Hibiscus syriacus</i> cv	Rose of Sharon
144	<i>Hosta x hybrida</i> cv.	Plaintain Lily
145	<i>Hydrangea macrophylla</i>	Bigleaf Hydrangea
146	<i>Hydrangea quercifolia</i>	Oakleaf Hydrangea
147	<i>Ilex cornuta</i> cv.	Chinese Holly
148	<i>Ilex crenata</i> cv.	Japanese Holly
149	<i>Ilex x meserveae</i> cv.	Meserve Holly
150	<i>Impatiens hybrid</i> cv.	Impatiens
151	<i>Itea virginica</i>	Sweetspire
152	<i>Juniperus chinensis</i> cv.	Chinese Juniper
153	<i>Juniperus horizontalis</i> cv.	Creeping Juniper
154	<i>Lagerstroemia indica</i> cv.	Crape Myrtle
155	<i>Leucanthemum x superbum</i> cv.	Shasta Daisy
156	<i>Liquidambar styraciflua</i>	Sweet Gum
157	<i>Liriodendron tulipifera</i>	Tuliptree
158	<i>Liriope</i> spp. cv.	Lilyturf
159	<i>Lonicera japonica</i> 'Halliana'	Hall's Japanese Honeysuckle
160	<i>Magnolia grandiflora</i> cv.	Southern Magnolia
161	<i>Magnolia x soulangiana</i> cv.	Chinese (Saucer) Magnolia
162	<i>Mahonia aquifolia</i> cv.	Oregon Grape
163	<i>Malus</i> spp. and cv.	Flowering Crabapple
164	<i>Miscanthus sinensis</i> cv.	Miscanthus grass

No.	Botanical Name	Common Name
165	<i>Myrica pensylvanica</i>	Bayberry
166	<i>Nandina domestica</i>	Heavenly Bamboo
167	<i>Nyssa sylvatica</i>	Sour (Black) Gum
168	<i>Pachysandra terminalis</i>	Japanese Spurge
169	<i>Paeonia hybrid cv.</i>	Peony
170	<i>Parthenocissus tricuspidata</i>	Boston Ivy
171	<i>Pelargonium x hortorum cv.</i>	Zonal Geranium
172	<i>Pennisetum ruppelia</i>	Fountain Grass
173	<i>Petunia x hybrida cv.</i>	Petunia
174	<i>Philodendron scandens oxycardium</i>	Heartleaf Philodendron
175	<i>Phlox paniculate</i>	Garden Phlox
176	<i>Phlox sublata cv.</i>	Moss Pink
177	<i>Picea abies</i>	Norway Spruce
178	<i>Picea pungens cv.</i>	Colorado (Blue) Spruce
179	<i>Pieris japonica</i>	Lily-of-the-Valley Bush
180	<i>Pinus mugo</i>	Mugo Pine
181	<i>Pinus strobus</i>	Eastern White Pine
182	<i>Pinus thunbergiana</i>	Japanese Black Pine
183	<i>Platanus x acerifolia</i>	London Planetree
184	<i>Poa pratensis cv.</i>	Kentucky Bluegrass
185	<i>Podocarpus macrophyllus</i>	Southern Yew
186	<i>Potentilla fruticosa cv.</i>	Shrubby Cinquefoil
187	<i>Prunus laurocerasus cv.</i>	Cherry Laurel
188	<i>Prunus serrulata</i>	Kwanzan Japanese Flowering Cherry

No.	Botanical Name	Common Name
189	<i>Pyracantha coccinea cv.</i>	Firethorn
190	<i>Quercus alba</i>	White Oak
191	<i>Quercus palustris</i>	Pin Oak
192	<i>Quercus rubra</i>	Red Oak
193	<i>Rhododendron Hybrid</i>	Exbury Hybrid Azalea
194	<i>Rhododendron x catawbiense</i>	Catawba Hybrid Rhododendron
195	<i>Rosa spp.</i>	Landscape/Shrub Rose cv.
196	<i>Rudbeckia fulgida</i>	Black-eyed Susan
197	<i>Salvia nemorosa cv.</i>	Meadow Sage
198	<i>Sedum spp.</i>	Sedum
199	<i>Spiraea x bumalda</i>	Bumalda Spirea
200	<i>Syringa vulgaris cv.</i>	Common Lilac
201	<i>Taxodium distichum</i>	Bald Cypress
202	<i>Taxus spp. and cv.</i>	Yew
203	<i>Thuja occidentalis cv.</i>	American Arborvitae
204	<i>Tilia cordata</i>	Littleleaf Linden
205	<i>Tsuga canadensis</i>	Canadian Hemlock
206	<i>Verbena x hybrida cv.</i>	Garden Verbena
207	<i>Viburnum trilobum</i>	American Cranberrybush Viburnum
208	<i>Viburnum x burkwoodii</i>	Burkwood Viburnum
209	<i>Vinca minor cv.</i>	Periwinkle
210	<i>Viola x wittrockiana cv.</i>	Pansy
211	<i>Weigela florida</i>	Weigelia
212	<i>Wisteria sinensis cv.</i>	Chinese Wisteria
213	<i>Yucca filamentosa</i>	Adam's Needle

Nursery/Landscape Plant Identification – 2024

No.	Botanical Name	Common Name
101	<i>Abelia x grandiflora cv.</i>	Glossy Abelia
102	<i>Acer palmatum cv.</i>	Japanese Maple
103	<i>Acer rubrum cv.</i>	Red Maple
104	<i>Acer saccharum cv.</i>	Sugar Maple
105	<i>Aglaonema commutatum</i>	'Chinese Evergreen'
106	<i>Ajuga reptans cv.</i>	Carpet Bugle
107	<i>Amelanchier arborea</i>	Downy Serviceberry
108	<i>Aquilegia x hybrida cv.</i>	Columbine
109	<i>Astilbe hybrid cv.</i>	Astilbe
110	<i>Begonia semperflorens-cultorum</i>	Wax Begonia
111	<i>Berberis x mentorensis</i>	Mentor Barberry
112	<i>Betula nigra</i>	River Birch
113	<i>Buddleia davidii cv.</i>	Butterfly Bush
114	<i>Buxus microphylla cv.</i>	Littleleaf Boxwood
115	<i>Camellia japonica cv.</i>	Common Camellia
116	<i>Cedrus atlantica 'Glauca'</i>	Blue Atlas Cedar
117	<i>Cercis canadensis</i>	Redbud
118	<i>Chaenomeles speciosa cv.</i>	Japanese (Flowering) Quince
119	<i>Clematis hybrid</i>	Clematis
120	<i>Cornus florida cv.</i>	Flowering Dogwood
121	<i>Cotoneaster dammeri</i>	Bearberry Cotoneaster
122	<i>Crataegus phaenopyrum</i>	Washington Hawthorn
123	<i>Cynodon dactylon cv</i>	Bermudagrass
124	<i>Dieffenbachia maculata cv.</i>	Spotted Dumb Cane
125	<i>Dracaena deremensis 'Warneckii'</i>	Striped Dracaena
126	<i>Dracaena fragrans 'Massangeana'</i>	Corn Plant
127	<i>Echinacea purpurea</i>	Purple Coneflower
128	<i>Epipremnum spp.</i>	Pothos
129	<i>Euonymus alatus</i>	Winged Euonymus
130	<i>Euonymus fortunei cv.</i>	Wintercreeper
131	<i>Festuca spp. and cv.</i>	Fescue
132	<i>Ficus benjamina</i>	Benjamin Fig
133	<i>Ficus elastica 'Decora'</i>	Decora Rubber Plant
134	<i>Forsythia x intermedia cv.</i>	Border Forsythia

No.	Botanical Name	Common Name
135	<i>Fraxinus American cv.</i>	White Ash
136	<i>Gaillardia aristata cv.</i>	Common Blanketflower
137	<i>Gardenia jasminoides cv.</i>	Gardenia
138	<i>Ginkgo biloba</i>	Ginkgo, Maidenhair Tree
139	<i>Gleditsia triacanthos inermis cv.</i>	Thornless Honeylocust
140	<i>Hedera helix cv.</i>	English Ivy
141	<i>Helleborus orientalis cv.</i>	Lenten Rose
142	<i>Hermerocallis spp. and cv.</i>	Day lily
143	<i>Heptapleurum actinophylla</i>	Schefflera, Octopus Tree
144	<i>Heptapleurum arbicola</i>	Dwarf Schefflera
145	<i>Heuchera cv.</i>	Coral Bells, Alumroot
146	<i>Hibiscus syriacus cv</i>	Rose of Sharon
147	<i>Hosta x hybrida cv.</i>	Plantain Lily
148	<i>Hydrangea macrophylla</i>	Bigleaf Hydrangea
149	<i>Hydrangea quercifolia</i>	Oakleaf Hydrangea
150	<i>Ilex cornuta cv.</i>	Chinese Holly
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152	<i>Ilex x meserveae cv.</i>	Meserve Holly
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154	<i>Itea virginica</i>	Sweetspire
155	<i>Juniperus chinensis cv.</i>	Chinese Juniper
156	<i>Juniperus horizontalis cv.</i>	Creeping Juniper
157	<i>Lagerstroemia indica cv.</i>	Crape Myrtle
158	<i>Leucanthemum x superbum cv.</i>	Shasta Daisy
159	<i>Liquidambar styraciflua</i>	Sweet Gum
160	<i>Liriodendron tulipifera</i>	Tuliptree
161	<i>Liriope spp. cv.</i>	Lilyturf
162	<i>Lonicera japonica 'Halliana'</i>	Hall's Japanese Honeysuckle
163	<i>Magnolia grandiflora cv.</i>	Southern Magnolia
164	<i>Magnolia x soulangiana cv.</i>	Chinese (Saucer) Magnolia
165	<i>Mahonia aquifolia cv.</i>	Oregon Grape
166	<i>Malus spp. and cv.</i>	Flowering Crabapple
167	<i>Miscanthus sinensis cv.</i>	Miscanthus grass
168	<i>Myrica pensylvanica</i>	Bayberry

No.	Botanical Name	Common Name
169	<i>Nandina domestica</i>	Heavenly Bamboo
170	<i>Nyssa sylvatica</i>	Sour (Black) Gum
171	<i>Pachysandra terminalis</i>	Japanese Spurge
172	<i>Paeonia hybrid cv.</i>	Peony
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177	<i>Philodendron scandens oxycardium</i>	Heartleaf Philodendron
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198	<i>Rosa spp.</i>	Landscape/Shrub Rose cv.
199	<i>Rudbeckia fulgida</i>	Black-eyed Susan
200	<i>Salvia nemorosa cv.</i>	Meadow Sage
201	<i>Sedum spp.</i>	Sedum
202	<i>Spiraea x bumalda</i>	Bumalda Spirea
203	<i>Syringa vulgaris cv.</i>	Common Lilac
204	<i>Taxodium distichum</i>	Bald Cypress
205	<i>Taxus spp. and cv.</i>	Yew
206	<i>Thuja occidentalis cv.</i>	American Arborvitae
207	<i>Tilia cordata</i>	Littleleaf Linden
208	<i>Tsuga canadensis</i>	Canadian Hemlock
209	<i>Verbena x hybrida cv.</i>	Garden Verbena
210	<i>Viburnum trilobum</i>	American Cranberrybush Viburnum
211	<i>Viburnum x burkwoodii</i>	Burkwood Viburnum
212	<i>Vinca minor cv.</i>	Periwinkle
213	<i>Viola x wittrockiana cv.</i>	Pansy
214	<i>Weigela florida</i>	Weigelia
215	<i>Wisteria sinensis cv.</i>	Chinese Wisteria
216	<i>Yucca filamentosa</i>	Adam's Needle

Pests, Disorders and Beneficial Insects Identification

No.	Item Name
Pests	
217	Aphid
218	Bagworm
219	Borer
220	Leafhopper
221	Leaf Miner
222	Scale
223	Spider Mite
224	Snail/Slug
225	Whitefly
226	White Grub
Disease	
227	Anthraxnose
228	Apple Scab
229	Black Spot
230	Botrytis
231	Canker
232	Cedar-Apple Rust
233	Crown Gall
234	Fire blight
235	Powdery Mildew
236	Root Rot

No.	Item Name
Weeds	
237	Annual Bluegrass
238	Broadleaf Plantain
239	Buckhorn Plantain
240	Chickweed
241	Crabgrass
242	Dandelion
243	Henbit
244	Nutsedge
245	Oxalis
246	Purslane
247	Clovers
Physiological Problems	
248	Frost/Freeze Injury
249	Iron Deficiency
250	Leaf Scorch (drought/winter burn)
251	Nitrogen Deficiency
252	Pot-Bound Roots
253	String Trimmer Injury
254	2,4-D Injury
Beneficial Insects	
255	Praying Mantis
256	Lady Beetle
257	Paper Wasp
258	Lacewing
259	Spider

Potting Nurse Stock Practicum Scorecard

50 POINTS

Name _____ Member Number _____

Chapter _____ State _____ Team Number _____

	Strong evidence of skill 5-4 points	Moderate evidence of skill 3-2 points	Weak evidence of skill 1-0 points	Weight	Earned
Potting Process (34 points)					
Preparation of Plants Handles plants properly selecting for quality and uniformity, inspecting/pruning and grooming the damaged parts and pruning excess root length.	Plants are uniform in size and shape, properly handled, correct number selected, properly inspected, pruned and prepared for planting.	Plants are somewhat uniform in size and shape, somewhat properly handled, slightly off in correct number selected, failed to properly inspect, prune or prepare for planting.	Plants are not uniform in size and shape, poorly handled, correct number not selected, failed to properly inspect, prune or prepare for planting.	x 2	
Placement of Plants in Containers Plant centered and vertical at the proper depth. Roots carefully and properly spread and covered.	Holes are made prior to placing plant in soil, the entire root system is covered, leaving proper stem length visible and properly set.	Minor amount of roots are showing, planted slightly too deep or shallow and set somewhat correctly.	A large amount of roots are showing or plant stem is covered with soil.	x 2	
Media Filling and Settling Sufficient media added Media settled by bumping or hand firming Plant remains stable	Growing media is filled to the inner lip of the pot, properly settled, stabilizing the plant in the container.	Growing media is filled slightly too high or low, media was improperly settled leaving the plant slightly unstabled.	Growing media is left very low or completely fills pot, media was improperly settled leaving the plant unstabled.	x 2	
	2 points	1 points	0 points	Weight	Earned
Labeling of Completed Units Legibly labeled with the plant (variety) name and date	Legibly labeled with date planted, plant name, and cultivar.	Somewhat legibly labeled with some but not all information required.	Illegible or no label present or labeled with incorrect information.	x 1	
Safety Practices Applied Safety practices followed with proper cutting technique and tools stowed. Minimal clutter/good organization in work area	Followed safety practices - properly closing tools, using proper cutting technique, and maintaining work area.	Followed most safety practices, - properly closing tools, using proper cutting technique, and maintaining work area fairly well.	Failed to follow safety practices, - properly closing tools and using proper cutting technique, the work area needs to be more organized.	x 1	
Potting Productivity and Response to Questions (16 points) Note: 6 points for questions					
	10-7 points	6-4 points	3-0 points	Weight	Earned
Quantity & Quality Overall quality, uniformity, and number of units completed	Required number of units completed; final product uniform, materials upright, clean/neat, commercially acceptable	Approximately 2/3 completed; final product moderately uniform, materials upright, clean/neat, generally acceptable	Less than 2/3 of units completed; final product not uniform, materials vary in condition, generally non-commercial condition	X 1	
	6-5 points	4-2 points	1-0 points	Weight	Earned
Response to Questions	Answered questions correctly	Answered some questions correctly	Did not or incorrectly answered questions.	X 1	
TOTAL POINTS EARNED OUT OF 50 POSSIBLE					

Judge's Name _____ Judge's Signature _____ Date _____

Propagating Nursery Stock Practicum Scorecard

50 POINTS

Name _____ Member Number _____
Chapter _____ State _____ Team Number _____

	Strong evidence of skill 5-4 points	Moderate evidence of skill 3-2 points	Weak evidence of skill 1-0 points	Weight	Earned
Propagation Process (34 points)					
Removal of Cuttings Selects best quality uniform stock; Clean cuts at appropriate lengths	Best stock selected and clean cuts made at appropriate length	Most stock selected is of appropriate quality and mostly clean cuts made close to appropriate length.	Cutting stock is of poor quality with poorly made cuts of an incorrect length.	x1	
Preparation of Cuttings Angled or wounded basal cuts used in correctly prepared cuttings; correctly placed in relation to nodes. Cutting/buds not damaged.	Cuttings are correctly prepared with angled or wounded basal cuts without damage to the cutting or the buds.	Cuttings are mostly correctly prepared with angled or wounded basal cuts with minimal damage to the cutting or the buds.	Cuttings are incorrectly prepared with damage to the cutting or the buds.	x2	
	7-5 points	4-2 points	1-0 points	Weight	Earned
Application of Proper Hormone Sufficient applied and excess removed; Hormone kept clean.	Clean hormone applied in sufficient amounts with excess removed from cutting.	Clean hormone applied without removing excess from cutting.	Failed to keep hormone clean and applied sparingly.	1	
	8-6 points	5-3 points	2-0 points	Weight	Earned
Placement of Cuttings in Media Proper medium depth, as applicable; Media furrow cut and closed; Proper sticking depth; Efficient row and cutting spacing.	Cuttings are placed at the proper depth in medium with furrow cut and closed; Cuttings are placed in efficient rows and cutting spacing.	Cuttings are mostly placed at the proper depth in medium with furrow cut and closed; Most cuttings are placed in efficient rows and cutting spacing.	Few or no cuttings are placed at the proper depth in medium with furrow cut and closed; Cutting rows or poor and spacing inappropriate.	1	
	2 points	1 points	0 points	Weight	Earned
Labeling of Completed Units Legibly labeled with the plant (variety) name and date	Legibly labeled with date planted, plant name, and cultivar.	Somewhat legibly labeled with some but not all information required.	Illegible or no label present or labeled with incorrect information.	x1	2
Safety Practices Applied Safety practices followed with proper cutting technique and tools stowed. Minimal clutter/good organization in work area	Followed safety practices - properly closing tools, using proper cutting technique, and maintaining work area.	Followed most safety practices, - properly closing tools, using proper cutting technique, and maintaining work area fairly well.	Failed to follow safety practices, - properly closing tools and using proper cutting technique, the work area needs to be more organized.	x1	2
Propagation Productivity and Response to Questions (16 points)					
Note: 6 points for questions					
	10-7 points	6-4 points	3-0 points	Weight	Earned
Quality of Units Completed • Overall quality and uniformity of lot	Final product presented to the judge with plants upright, pot clean, and in sellable condition	Final product presented to the judge with plants upright, pot clean, and in sellable condition	Final product presented to judge in non-sellable condition	X1	
	6-5 points	4-2 points	1-0 points	Weight	Earned
Response to Questions	Answered questions correctly	Answered some questions correctly	Did not or incorrectly answered questions.	X1	
TOTAL POINTS EARNED OUT OF 50 POSSIBLE					

Judge's Name _____ Judge's Signature _____ Date _____
Judges please award points as whole numbers only, no fractions

Team Activity Cooperation/Teamwork Rubric

50 POINTS

Chapter _____

State _____

Team Number _____

Indicator	Very strong evidence of skill is present 5-4 points	Moderate evidence of skill is present 3-2 points	Weak evidence of skill is present 1-0 points	Weight	Points Earned
Understanding of task(s) assigned	Clearly all members show understanding of the assigned task(s).	Two to three members show understanding of the assigned task(s).	One member shows understanding of assigned task(s).	X 2	
A leader for the team is chosen	All four members are involved in choosing a leader.	Two to three members are involved in choosing a leader.	One member decides they will be the leader.	X 2	
Agreement reached among team members on who will do which skills.	All four members have task responsibilities outlined and defined.	Two or three members have task responsibilities outlined and defined.	One member has have task responsibilities outlined and defined.	X 2	
A plan is made on how to complete tasks if difficulties arise.	Team discussed who would assist whom to make sure tasks are completed.	Leader of the team assigns who will help others complete tasks.	No plan is made for assisting others to complete tasks.	X 2	
Willingness to help others in accomplishing task	All members willing to assist others.	Three members willing to assist others.	Two or less members willing to assist others.	X 2	
TOTAL POINTS EARNED OUT OF 50 POSSIBLE					

Judge's Name _____

Judge's Signature _____

Date _____

Verbal Customer Assistance Rubric

50 POINTS

Name	Member Number
Chapter	State Team Number


Indicator	Very strong evidence of skill is present 5-4 points	Moderate evidence of skill is present 3-2 points	Weak evidence of skill is present 1-0 points	Points Possible	Points Earned
First impression	Individual identifies themselves with a good first impression.	Individual mostly identifies themselves with a good first impression.	Individual poorly identifies themselves with a good first impression.	5	
Personal rapport	Individual asks questions and utilizes information from answers in an attempt to build personal rapport.	Individual mostly asks questions and utilizes information from answers in an attempt to build personal rapport.	Individual poorly asks questions and utilizes information from answers in an attempt to build personal rapport.	5	
Clarifying questions	Individual asks questions to learn about the customer's situation and to confirm preliminary customer information.	Individual mostly asks questions to learn about the customer's situation and to confirm preliminary customer information.	Individual poorly asks questions to learn about the customer's situation and to confirm preliminary customer information.	5	
Needs and wants	Individual confirmed and discovered customer needs and wants.	Individual mostly confirmed and discovered customer needs and wants.	Individual poorly confirmed and discovered customer needs and wants.	5	
Features and benefits	Individual applied features and benefits of their product to the customer's needs/wants.	Individual mostly applied features and benefits of their product to the customer's needs/wants.	Individual poorly applied features and benefits of their product to the customer's needs/wants.	5	
Matching needs and wants	Individual allows customer to participate in matching their wants/needs to the product features.	Individual mostly allows customer to participate in matching their wants/needs to the product features.	Individual poorly allows customer to participate in matching their wants/needs to the product features.	5	
Trial close	Individual uses appropriate technique to confirm customer understanding.	Individual mostly uses appropriate technique to confirm customer understanding.	Individual poorly uses appropriate technique to confirm customer understanding.	5	
Objections	Student listens and clarifies customers objections and discusses the features/benefits of the product information to address the customers objections.	Student mostly listens and clarifies customers objections and discusses the features/benefits of the product information to address the customers objections.	Student poorly listens and clarifies customers objections and discusses the features/benefits of the product information to address the customers objections.	5	
Close transaction	Student closes or attempts to close the transaction.	Student mostly closes or attempts to close the transaction.	Student poorly closes or attempts to close the transaction.	5	
Active listening	Individual actively listens to comments and answers from the customer.	Individual mostly listens to comments and answers from the customer.	Individual poorly listens to comments and answers from the customer.	5	
TOTAL POINTS EARNED OUT OF 50 POSSIBLE					

Judge's Name	Judge's Signature	Date
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Nursery/Landscape Team Skills Challenge

400 POINTS

The Team Skills Challenge has two rotations of 20 minutes each valued at 200 points. Each skill may take up to 20 minutes to complete. It is the responsibility of the team to determine how to split their team to complete the challenges presented within the rotation.

Chapter	State	Team Number
A. 	Score =	points of possible
B.	Score =	points of possible
C.	Score	points of possible
D.	Score	points of possible
E.	Score	points of possible
F.	Score	points of possible
G.	Score	points of possible
H.	Score	points of possible
Total Points		of 400 Points Possible

Judge's Name

Judge's Signature

Date

Skill Number	Skill Title	Points
1	Plant Layout	100
2	Basic Program Controller	100
3	Irrigation Zone Installation and Repair	100
4	Line Trimmer	50
5	Chainsaw	50
6	Edger	50
7	Power Blower	50
8	Surveying Instrument	100
9	Push Mower	50
10	ZTR Mower	50
11	Intermediate Walk-Behind Mower	50
12	Sod Installation	100
13	Tree Planting	100
14	Grading and Draining	100
15	Paver Installation	100
16	Skid Steer Loader Operation	50
17	Pruning	100
18	Fertilizer Application	50
19	Service Receipt	50
20	Wall Installation	100
21	Shrub/Perennial Installation	100

Skills Event 1



PLANT LAYOUT SCORECARD

Name(s) _____ State _____ Team Number _____

Criteria	Points Possible	Points Deducted	Points Earned
Placement of Plant Material			
Plant placed within 6 inches +/- of correct placement (5 points each)	20		
Facing of Plant Material			
Plant faced properly (5 points each)	20		
Handling of Plant Material			
Plant handled properly (5 points each)	10		
Correct Viewpoint	5		
Explain Plant Care	5		
Safety Procedures			
Safely and properly followed lifting procedures (5 pts per student)	10		
Safety glasses worn (5 pts per student)	10		
Gloves worn	10		
Completed Design	10		
TOTAL POINTS EARNED OUT OF 100 POSSIBLE			

Judge's Comments

Judge's Name _____ Judge's Signature _____ Date _____

Skills Event 2

BASIC PROGRAM CONTROLLER SCORECARD



Name(s)

State

Team Number

Criteria	Points Possible	Points Earned
Initial Programming		
Set to current day	5	
Set to current time	5	
Clear other programs of everything previously set up	5	
Irrigation Programming as directed		
Station (zone) 1 & 3 Program A	10	
Station (zone) 2 & 4 Program B	10	
Start time: for Programs A & B	10	
All zones will be watered on designated days	5	
Manual Operation		
Manually activate station as directed	10	
Installation of Zone Valve		
Wired correctly into the controller	20	
Installed in proper location per design	10	
Wire nuts tight	10	
TOTAL POINTS EARNED OUT OF 100 POSSIBLE		

Judge's Comments

Judge's Name

Judge's Signature

Date



Skills Event 3

IRRIGATION ZONE INSTALLATION AND REPAIR SCORECARD

Name(s)

State

Team Number

Criteria	Points Possible	Points Earned
Properly Repair Lateral Break		
Removed damaged section of pipe	5	
Removed any burrs or rough edges and cleaned surface	5	
Applied primer and cement properly and cleaned up excess glue	5	
Fittings to be properly set or extended	10	
Installation of Irrigation Zone		
Pipe cut to proper length +/- 1 inch (5 points deducted for each error)	20	
Proper fitting used (5 points deducted for each error)	15	
Heads set in proper location	10	
Heads adjusted properly (5 points per ??)	15	
Safety Procedures		
Eye protection used (5 points per student)	10	
Gloves used while cutting pipe and gluing	5	
TOTAL POINTS EARNED OUT OF 100 POSSIBLE		

Judge's Comments

Judge's Name

Judge's Signature

Date

Skills Event 4



LINE TRIMMER SCORECARD

Name(s) _____

State _____

Team Number _____

Criteria	Point Possible	Points Earned
Pre-Operation Check		
Checked air filter and explained	5	
Checked fuel level and filled on hard surface	5	
Equipment Operation		
Installed trimmer line into Trimmer Head	8	
Demonstrated how to start engine with Trimmer on ground	5	
Demonstrated how to trim around posts without hitting post	10	
Safety Procedures		
Ear protection used	7	
Eye protection used	5	
Avoided pedestrian traffic while trimming (<i>Judge is pedestrian</i>)	5	
TOTAL POINTS EARNED OUT OF 50 POSSIBLE		

Judge's Comments

Judge's Name _____

Judge's Signature _____

Date _____

Skills Event 5



CHAINSAW SCORECARD

Name(s) State Team Number

Criteria	Points Possible	Points Earned
Pre-Operation Check		
Located and checked air filter	3	
Adjusted chain tension with gloves on	7	
Checked bar oil level and explained its purpose	5	
Demonstrated fueling of tank with proper fuel	2	
Equipment Operation		
Demonstrated how to start engine, choke and set chain brake with saw on the ground	8	
Demonstrated how to cut a log on a saw buck	5	
Safety Procedures (All PPE must be on before attempting this event)		
Ear protection used	4	
Eye protection used	4	
Chaps used	4	
Hard hat used	4	
Gloves used	4	
TOTAL POINTS EARNED OUT OF 50 POSSIBLE		

Judge's Comments

Judge's Name Judge's Signature Date

Skills Event 6



EDGER SCORECARD

Name(s)

State

Team Number

Criteria	Points Possible	Points Earned
Pre-Operation Check		
Checked air filter	5	
Checked fuel level and filled on a hard surface	5	
Changed edger blade	5	
Equipment Operation		
Demonstrated how to start engine with edger on the ground	5	
Demonstrated how to edge a sidewalk on a section of lumber	10	
Safety Procedures		
Ear protection used	7	
Eye protection used	7	
Avoided pedestrian traffic (<i>Judge is pedestrian</i>)	6	
TOTAL POINTS EARNED OUT OF 50 POSSIBLE		

Judge's Comments

Judge's Name

Judge's Signature

Date

Skills Event 7



POWER BLOWER SCORECARD

Name(s) _____ State _____ Team Number _____

Criteria	Points Possible	Points Earned
Pre-Operation Check		
Checked air filter and fan grill	5	
Checked fuel level and fill on a hard surface	5	
Equipment Operation		
Cleaned up hazards before blowing area	5	
Demonstrated how to start engine with blower on the ground	5	
Blew debris away from building	5	
Demonstrated proper clearing of the sidewalk	5	
Safety Procedures		
Ear protection used	5	
Eye protection used	5	
Dust mask used while blowing	5	
Avoided pedestrian traffic (<i>Judge is pedestrian</i>)	5	

TOTAL POINTS EARNED OUT OF 50 POSSIBLE

Judge's Comments

Judge's Name _____ Judge's Signature _____ Date _____

Skills Event 8

SURVEYING INSTRUMENT SCORECARD

Name(s) _____ State _____ Team Number _____

Criteria	Points Possible	Points Earned
Instrument Set Up and Knowledge		
Instrument set up	10	
Knowledge of builder's level, transit, laser	10	
Determining the benchmark (Point A)	10	
Elevation Readings and Calculations		
Point B	5	
Point C	5	
Point D	5	
Calculated the elevation difference between point A and C	7	
Calculated the elevation difference between point A and D	7	
Cut and Fill Problems		
Calculated the percent slope between A and D	15	
How much fill or cut would be needed between point A and D to create a _____ percent slope?	10	
Explained the marks on a grade stake	5	
Explained the difference between an architect's and engineer's story pole	6	
Properly dismantled and stored equipment	5	
TOTAL POINTS EARNED OUT OF 100 POSSIBLE		

Judge's Comments

Judge's Name _____ Judge's Signature _____ Date _____

Skills Event 9



PUSH MOWER SCORECARD

Name(s)

State

Team Number

Criteria	Points Possible	Points Earned
Pre-Start Procedures		
Checked oil level and air cleaner	5	
Changed mower blade	9	
Mower guard down or bag in place	5	
Adjusted mower height	5	
Equipment Operation		
Two times outside area	3	
Mowed around trees on left side of mower	3	
Safety Procedures		
Ear protection used	5	
Eye protection used	5	
Hazards were observed and cleaned up before mowing	5	
Avoided pedestrian traffic (<i>Judge is pedestrian</i>)	5	
TOTAL POINTS EARNED OUT OF 50 POSSIBLE		

Judge's Comments

Judge's Name

Judge's Signature

Date

ZTR MOWER SCORECARD

Name(s)

State

Team Number

Criteria	Points Possible	Points Earned
Pre-Start Procedures		
Checked oil level	5	
Checked hydraulic system oil level check	2	
Checked air cleaner and grease fittings	3	
Checked Belts, pulleys, guards	3	
Adjusting mower height	5	
Equipment Operation		
Sat on mower before starting	6	
Two times outside area	3	
Mowed around trees on left side of mower	3	
Safety Procedures		
Ear protection used	5	
Eye protection used	5	
Hazards were cleaned up before mowing	5	
Avoided pedestrian traffic (<i>Judge is pedestrian</i>)	5	
TOTAL POINTS EARNED OUT OF 50 POSSIBLE		

Judge's Comments

Judge's Name

Judge's Signature

Date

Skills Event 11

INTERMEDIATE WALK-BEHIND MOWER SCORECARD

Name(s)

State

Team Number

Criteria	Points Possible	Points Earned
Pre-Start Procedures		
Checked oil level	5	
Checked hydraulic system oil level check	2	
Checked air cleaner and grease fittings	3	
Checked belts, pulleys, guards	3	
Adjusted mower height	5	
Equipment Operation		
Started mower properly	6	
Two times outside area	3	
Mowed around trees on left side of mower	3	
Safety Procedures		
Eye protection used	5	
Ear protection used	5	
Cleaned up hazards before mowing	5	
Avoided pedestrian traffic (<i>Judge is pedestrian</i>)	5	
TOTAL POINTS EARNED OUT OF 50 POSSIBLE		

Judge's Comments

Judge's Name

Judge's Signature

Date

Skills Event 12

SOD INSTALLATION SCORECARD

Name(s) _____ State _____ Team Number _____

Criteria	Points Possible	Points Deducted	Points Earned
Graded area according to problem description	10		
Rolled area (pre sod) according to problem description	5		
Calculated and weighed proper amount of fertilizer	6		
Applied fertilizer evenly (<i>round down to the nearest pound</i>)	6		
Sodded strips adjacent to edges full width	5		
Staggered seams on sod rolls	8		
Knitted seams tightly	5		
Made cuts accurately	5		
Irrigation heads/valve box visible	8		
Rolled sod after installation	7		
Explained watering of new sod	10		
Safety Procedures			
Eye protection used	10		
Demonstrated proper lifting techniques	5		
<i>Additional safety violations: Deduct 3 points for each observed safety violation such as tools used improperly, etc.</i>			
Completed sodding the box	10		
TOTAL POINTS EARNED OUT OF 100 POSSIBLE			

Judge's Comments

Judge's Name _____ Judge's Signature _____ Date _____

Skills Event 13



TREE PLANTING SCORECARD

Name(s) _____

State _____

Team Number _____

Criteria	Points Possible	Points Deducted	Points Earned
Hole Dimension According to Detail			
Width	10		
Depth	10		
Planted According to Detail			
Root pruning	5		
Handled correctly	5		
Soil berm	5		
Tamped properly	5		
Mulched properly	5		
Explained watering method for new tree	15		
Stake and Wire tree according to specifications sheet			
Stakes at correct depth	5		
Stakes straight and plumb	5		
Stakes placed per prevailing wind	5		
Straps installed at correct height	5		
Safety Procedures			
Eye protection used	5		
Proper lifting techniques were used	5		
Proper use of gloves while staking the tree	5		
Wore hard hat while staking the tree	5		
<i>Additional safety violations: Deduct 3 points for each observed safety violation, such as tools used improperly, etc.</i>			
TOTAL POINTS EARNED OUT OF 100 POSSIBLES			

Judge's Comments

Judge's Name _____

Judge's Signature _____

Date _____

Skills Event 14

GRADING AND DRAINAGE SCORECARD

Name(s)

State

Team Number

Criteria	Points Possible	Points Deducted	Points Earned
Resemblance to Scale Drawing of Sand Mound			
Top of mound at proper elevation	10		
Top of mound at proper location	10		
Elevation Points (3 different elevation points will be checked by judge)			
Point A	10		
Point B	10		
Point C	10		
Location and Elevation of Catch Basin			
Location	10		
Elevation	10		
Will the finished product drain?	15		
Safety Procedures			
Eye protection used	10		
Proper use of gloves	5		
<i>Additional Safety Violations: Deduct 3 points for each observed safety violation, such as tools used improperly, etc.</i>			
TOTAL POINTS EARNED OUT OF 100 POSSIBLE			

Note: Measurements are in 1/10 scale.

Judge's Comments

Judge's Name

Judge's Signature

Date

Skills Event 15



PAVER INSTALLATION SCORECARD

Name(s) _____ State _____ Team Number _____

Criteria	Points Possible	Points Earned
Procedure		
Set string line 90 degrees with the base line	10	
Installed running bond paver pad correctly	15	
Installed a basket weave pattern pad correctly	15	
Explain to the Judge the Steps Involved in Laying Pavers		
Using paint or stakes laid out the area to be installed	3	
Determined finish grade and set grade stakes	5	
Excavated a minimum of 6" for a solid base	3	
Created a 2 percent minimum slope	2	
Added base, compact no more than 4" at a time	3	
Base to be 6" beyond finished detentions	5	
Installed edging	3	
Installed sand and screed	3	
Laid pavers	2	
Cut pavers and use of ear protection	5	
Sand swept and compacted	3	
Safety Procedure		
Eye protection used	5	
Gloves used	5	
Used proper lifting techniques	5	
Finished paver installation	8	
TOTAL POINTS EARNED OUT OF 100 POSSIBLE		

Judge's Comments

Judge's Name _____ Judge's Signature _____ Date _____

Skills Event 16



SKID STEER LOADER SCORECARD

Name(s) _____ State _____ Team Number _____

Criteria	Points Possible	Points Deducted	Points Earned
Pre-Start Procedures			
Checked oil level and hydraulic system oil level	4		
Checked tire pressure	3		
Checked fuel check	4		
Checked air filter check	3		
Checked grease fittings	4		
Safe Operation of Equipment			
Proper mounting of loader using seatbelt and harness	4		
Proper exiting of loader	4		
Attaching front implements	4		
Safety Procedures			
Safety glasses used	5		
Ear protection used	5		
Seat belt was used	5		
Discussed observing people and hazards	5		
<i>Note: Deduct 10 points for any safety violation with a maximum of 20 points deducted.</i>			
TOTAL POINTS EARNED OUT OF 50 POSSIBLE			

Judge's Comments

Judge's Name _____ Judge's Signature _____ Date _____

Skills Event 17



PRUNING SCORECARD

Name(s) _____ State _____ Team Number _____

Criteria	Points Possible	Points Deducted	Points Earned
Tree Structure			
Identified trunk, leader and lateral branches	15		
Pruning Tools and Methods			
Properly used hand pruners on plants	10		
Properly used loppers on plants	10		
Demonstrated the 3-point cut method and provided rationale on a design	10		
Tree Pruning			
Identified 3 appropriate cuts and proper tool to use	15		
Shrub Pruning			
Demonstrated how to start and handle gas-powered hedge shears	10		
Safety Procedures			
Eye protection used	10		
Ear protection used	10		
Gloves used	5		
Chaps used while shearing	5		
<i>Note: Deduct 10 points for any safety violation — maximum of 20 points deducted.</i>			
TOTAL POINTS EARNED OUT OF 100 POSSIBLE			

Judge's Comments

Judge's Name _____ Judge's Signature _____ Date _____

Skills Event 18



FERTILIZER APPLICATION SCORECARD

Name(s) State Team Number

CRITERIA	Points Possible	Points Earned
Checked equipment spinner for proper operation before filling	5	
Adjusted spreader setting as instructed	2	
Measured the proper amount of fertilizer +/- 5 percent	13	
Filled spreader off of turf area	5	
No fertilizer spillage and spreader was closed prior to filling	5	
Opened spreader at appropriate time	5	
Spread fertilizer evenly	5	
Safety Procedures		
Eye protection used	5	
Gloves used	5	
TOTAL POINTS EARNED OUT OF 50 POSSIBLE		

Judge's Comments

Judge's Name Judge's Signature Date



SERVICE RECEIPT SCORECARD

Name(s)

State

Team Number

Criteria	Points Possible	Points Earned
Recorded crew time properly per scenario provided	10	
Checked off all services rendered	5	
Recorded actual pre-emergent herbicide and fertilizer calculations	5	
Recorded actual mulch calculation (<i>in cubic yards</i>)	5	
Recorded actual flats installed	5	
Recorded comments about irrigation head	5	
Explained annual care to client	10	
Crew leader signed off on service receipt	5	
TOTAL POINTS EARNED OUT OF 50 POSSIBLE		

Judge's Comments

Judge's Name

Judge's Signature

Date

Skills Event 20

WALL INSTALLATION SCORECARD



Name(s)

State

Team Number

Criteria	Points Possible	Points Deducted	Points Earned
Procedure			
Set string line 90 degrees with the base line	10		
Installed wall proper length	10		
Installed wall proper height	10		
Set cap stone properly	10		
Staggered seams on wall (face of wall is flat)	10		
Used proper cuts in wall	5		
Explained to the Judge the Steps Involved in Laying Pavers			
Excavated a minimum of 6" for a solid base (in keeping with mid-west specifications)	5		
Added base, compacted no more than 4" at a time	5		
Base to be 6" beyond finished wall	5		
Cut wall stone and used ear protection	5		
Used glue/mortar as needed (simulated while building the wall)	5		
Safety Procedure			
Eye protection used	5		
Gloves used	5		
<i>Note: Deduct 5 points for any safety violation — maximum of 20 points deducted, i.e. improper lifting, tool handling.</i>			
Finished the wall	10		
TOTAL POINTS EARNED OUT OF 100 POSSIBLE			

Judge's Comments

Judge's Name

Judge's Signature

Date

Skills Event 21

SHRUB/PERENNIAL INSTALLATION SCORECARD



Name(s)

State

Team Number

Criteria	Points Possible	Points Deducted	Points Earned
Placement of Plant Material			
Plants placed within 2" +/- of correct placement (5 points each)	15		
Facing of Plant Material			
Plants faced properly to a maximum of 15 points (5 points each)	15		
Handling of Plant Material			
Plant handled properly to a maximum of 15 points (5 points each)	15		
Correct viewpoint	5		
Explained proper plant care (watering- 5 points and pruning - 5 points)	10		
Mulch applied properly	10		
Safety Procedures and Proper Lifting of Plants			
Safely and properly followed lifting procedures	10		
Safety glasses and gloves used	10		
Finished planting per design	10		
TOTAL POINTS EARNED OUT OF 100 POSSIBLE			

Judge's Comments

Judge's Name

Judge's Signature

Date

Agriculture, Food and Natural Resources Content Standards

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
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.a. Define and provide examples of management skills used to organize an AFNR business (e.g., management types, organizational structures, time management techniques, conducting business agreements, etc.).	General knowledge exam	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.02.02. Performance Indicator: Assemble, interpret and analyze financial information and reports to monitor AFNR business performance and support decision-making (e.g., income statements, balance sheets, cash-flow analysis, inventory reports, break-even analysis, return on investment, taxes, etc.).		
ABS.02.02.02.a. Identify and examine strategies for tracking, reporting and managing inventory in AFNR businesses (e.g., spreadsheets, databases, word processing, networked systems and the internet, etc.).	General knowledge exam	CCSS.ELA-LITERACY.W.9-10.9 CCSS.ELA-LITERACY.W.11-12.9 CCSS.ELA-LITERACY.RH.9-10.7 CCSS.ELA-LITERACY.RH.11-12.7 CCSS.MATH.CONTENT.HSS.ID.C.7 CCSS.MATH.CONTENT.HSS.IC.B.6 CCSS.MATH.CONTENT.HSN.Q.A.1 Savings: Benchmarks: Grade 12, Statements 3 Savings: Benchmarks: Grade 12, Statements 4 Savings: Benchmarks: Grade 12, Statements 6 Savings: Benchmarks: Grade 12, Statements 7 Financial Investing: Benchmarks: Grade 12, Statement 2
ABS.03.01. Performance Indicator: Develop, assess and manage cash budgets to achieve AFNR business goals.		
ABS.03.01.01.a. Compare and contrast components of cash budgets used in AFNR businesses (e.g., anticipated revenue, production costs, overhead costs, profit, etc.).	General knowledge exam	CCSS.ELA-LITERACY.RH.9-10.7 CCSS.ELA-LITERACY.RH.11-12.7 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.IC.B.6
ABS.03.01.02.a. Research and summarize factors that impact management of cash budgets in AFNR businesses (e.g., changes in price of inputs/outputs, financial investment performance, capital purchases, human resources, etc.).	General knowledge exam	CCSS.ELA-LITERACY.RH.9-10.7 CCSS.ELA-LITERACY.RH.11-12.7 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.IC.B.6

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
ABS.04.01. Performance Indicator: Analyze characteristics and planning requirements associated with developing business plans for different types of AFNR businesses.		
ABS.04.01.02.a. Categorize the characteristics of the types of ownership structures used in AFNR businesses (e.g., sole proprietorships, cooperatives, partnerships and corporations).	General knowledge exam	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.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
ABS.04.03. Performance Indicator: Identify and apply strategies to manage or mitigate risk.		
ABS.04.03.01.a. Research and classify sources of risk for an AFNR business.	General knowledge exam	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.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
ABS.05.02. Performance Indicator: Assess and apply sales principles and skills to accomplish AFNR business objectives.		
ABS.05.02.01.a. Identify and explain components of the sales process for AFNR businesses (e.g., understanding needs, develop solutions, close sale, etc.).	Verbal customer assistance	CCSS.ELA-LITERACY.SL.9-10.6 CCSS.ELA-LITERACY.SL.11-12.6 CCSS.ELA-LITERACY.RH.9-10.7 CCSS.ELA-LITERACY.RH.11-12.7 Buying Goods & Services: Benchmarks: Grade 12, Statements 1 Buying Goods & Services: Benchmarks: Grade 12, Statements 3 Buying Goods & Services: Benchmarks: Grade 12, Statements 4 Buying Goods & Services: Benchmarks: Grade 12, Statements 5
ABS.05.03. Performance Indicator: Assess marketing principles and develop marketing plans to accomplish AFNR business objectives.		
ABS.05.03.01.a. Identify and explain marketing principles used in AFNR businesses (4 P's — product, place, price, promotion; attention, interest, desire, action, etc.).	Verbal customer assistance	AFNR Career Cluster – Agribusiness Systems Pathway, Statement 4 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.ELA-LITERACY.W.9-10.2 CCSS.ELA-LITERACY.W.11-12.2 CCSS.ELA-LITERACY.RH.9-10.7 CCSS.ELA-LITERACY.RH.11-12.7 CCSS.ELA-LITERACY.SL.9-10.6 CCSS.ELA-LITERACY.SL.11-12.6

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
		Buying Goods & Services: Benchmarks: Grade 12, Statements 1 Buying Goods & Services: Benchmarks: Grade 12, Statements 3 Buying Goods & Services: Benchmarks: Grade 12, Statements 4 Buying Goods & Services: Benchmarks: Grade 12, Statements 7
CS.03.01. Performance Indicator: Identify required regulations to maintain and improve safety, health and environmental management systems.		
CS.03.01.02.a. Summarize the importance of safety, health and environmental management in the workplace.	Skills	AFNR Career Cluster, Statement 6
CS.03.03. Performance Indicator: Apply health and safety practices to AFNR worksites.		
CS.03.03.03.a. Examine and categorize examples of how to avoid health or safety risks in AFNR worksites.	Skills	
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 equipment.	Skills	
CS.03.04.02.a. Identify standard tools, equipment and safety procedures related to AFNR tasks.	Identification Skills	
CS.03.04.03.a. Read and interpret operating instructions related to operation, storage and maintenance of tools and equipment related AFNR tasks.	Skills	
CS.03.04.03.b. Assess and demonstrate appropriate operation, storage and maintenance techniques for AFNR tools and equipment.	Skills	
CS.04.01. Performance Indicator: Identify and implement practices to steward natural resources in different AFNR systems.		
CS.04.01.01.a. Define stewardship of natural resources and distinguish how it connects to AFNR systems.	General knowledge exam	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3
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.).	General knowledge exam	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3
CRP.02.01. Performance Indicator: Use strategic thinking to connect and apply academic learning, knowledge and skills to solve problems in the workplace and community.		
CRP.02.01.01.a. Distinguish opportunities to apply academic learning to solve problems in the workplace (e.g., identify how to: increase productivity, reduce costs, lower inputs, etc.).	Team activity	
CRP.02.01.01.b. Assess workplace problems and identify the most appropriate academic knowledge and skills to apply.	Team activity	

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
CRP.02.01.02.a. Distinguish opportunities to apply academic learning to solve problems in the community (e.g., identify how to: stop businesses from closing, increase access to emergency services, eliminate hunger, reduce unemployment, etc.).	Team activity	
CRP.02.02. Performance Indicator: Use strategic thinking to connect and apply technical concepts to solve problems in the workplace and community.		
CRP.02.02.01.a. Identify opportunities to apply technical concepts to solve problems in the workplace (e.g., identify how to: increase sales, better customer service, reduce inputs, reduce waste, ensure sustainability, etc.).	Team activity	
CRP.02.02.01.b. Assess workplace problems and distinguish the most appropriate technical concepts to apply.	Team activity	
CRP.02.02.02.a. Identify opportunities to apply technical concepts to solve problems in the community (e.g., identify how to: ensure safe routes to schools, reduce vandalism, reduce air pollution, etc.).	Team activity	
CRP.02.02.02.b. Assess community problems and identify the most appropriate technical concepts to apply.	Team activity	
CRP.04.01. Performance Indicator: Speak using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.		
CRP.04.01.01.a. Identify and categorize strategies for ensuring clarity, logic, purpose and professionalism in verbal and non-verbal communication (e.g., vocal tone, organization of thoughts, eye contact, preparation, etc.).	Verbal customer assistance	
CRP.04.01.02.a. Examine and assess personal ability to speak with clarity, logic, purpose and professionalism in formal and informal settings (e.g., speeches, interviews, presentations, oral reports, etc.).	Verbal customer assistance	
CRP.04.01.02.b. Apply strategies for speaking with clarity, logic, purpose and professionalism in a variety of situations in formal and informal settings.	Verbal customer assistance	
CRP.04.03. Performance Indicator: Model active listening strategies when interacting with others in formal and informal settings.		
CRP.04.03.01.a. Research and summarize components of active listening (e.g., eye contact, have an open mind, restate, etc.).	General knowledge exam	
CRP.04.03.01.b. Apply active listening strategies (e.g., be attentive, observe non-verbal cues, ask clarifying questions, etc.).	Verbal customer assistance Team activity	
CRP.04.03.02.c. Model active listening strategies in formal and informal settings.	Verbal customer assistance Team activity	

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
CRP.05.02. Performance Indicator: Make, defend and evaluate decisions at work and in the community using information about the potential environmental, social and economic impacts.		
CRP.05.02.01.a. Examine areas in the workplace and community where decisions will make a positive impact.	Team activity	
CRP.05.02.01.b. Apply a structured decision-making process to improve workplace and community situations.	Team activity	
CRP.05.02.01.c. Evaluate and defend decisions applied in the workplace and community situations.	Team activity	
CRP.05.02.02.a. Examine information about environmental, social and economic impacts when making decisions in the workplace and community.	Team activity	
CRP.05.02.02.b. Assess past decisions made in workplace and community and analyze their effects on environmental, social and economic situations.	Team activity	
CRP.05.02.02.c. Evaluate workplace and community situations and propose decisions to be made based upon the positive impact made on environment, social and economic areas.	Team activity	
CRP.06.01. Performance Indicator: Synthesize information, knowledge and experience to generate original ideas and challenge assumptions in the workplace and community.		
CRP.06.01.01.a. Identify and summarize steps for generating ideas used in the workplace and community.	Team activity	
CRP.06.01.01.b. Synthesize information, knowledge and experiences to generate ideas for workplace and community situations.	Team activity	
CRP.06.01.01.c. Evaluate workplace and community situations and devise strategies to apply original ideas.	Team activity	
CRP.06.01.02.a. Define "assumption" and identify different types and sources of assumptions that could impact effectiveness in workplace and community situations.	Team activity	
CRP.06.01.02.b. Analyze how assumptions can impact outcomes in a variety of workplace and community situations.	Team activity	
CRP.06.01.02.c. Devise strategies (e.g., ask questions, brainstorm ideas, present facts and information, etc.) to challenge common assumptions in workplace and community situations.	Team activity	
CRP.06.03. Performance Indicator: Create and execute a plan of action to act upon new ideas and introduce innovations to workplace and community organizations.		

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
CRP.06.03.01.a. Examine workplace and community situations to identify opportunities for improvement through the introduction of new ideas and innovations.	Team activity	
CRP.06.03.01.b. Assess and communicate the risks and benefits of applying new ideas and innovations to the workplace and community.	Team activity	
CRP.06.03.01.c. Design a plan of action to introduce a new idea or innovation into the workplace and community.	Team activity	
CRP.06.03.02.a. Identify individuals and organizations (i.e., stakeholders) that need to provide input and feedback on new ideas or innovation prior to implementation in the workplace or community.	Team activity	
CRP.06.03.02.b. Elicit and assimilate input and feedback from individuals and organizations about new ideas or innovations for the workplace or community.	Team activity	
CRP.06.03.02.c. Evaluate and execute strategies for using stakeholder input and feedback to improve a plan of action for introducing a new idea or innovation into the workplace or community.	Team activity	
CRP.07.02. Performance Indicator: Evaluate the validity of sources and data used when considering the adoption of new technologies, practices and ideas in the workplace and community.		
CRP.07.02.02.a. Categorize potential technologies, practices and ideas that could be adopted by workplaces and community organizations.	Team activity	
CRP.08.01. Performance Indicator: Apply reason and logic to evaluate workplace and community situations from multiple perspectives.		
CRP.08.01.01.b. Apply steps for critical thinking to a variety of workplace and community situations.	Skills Team activity	
CRP.08.01.02.b. Assess solutions to workplace and community problems for evidence of reason, logic and consideration of multiple perspectives.	Team activity	
CRP.08.02. Performance Indicator: Investigate, prioritize and select solutions to solve problems in the workplace and community.		
CRP.08.02.01.a. Investigate and summarize potential tools and resources used to solve problems in the workplace and community.	Team activity	
CRP.08.02.01.b. Assimilate and prioritize potential solutions to solve problems in the workplace and community.	Team activity	
CRP.08.02.02.a. Identify and summarize steps in the decision-making process to solve workplace and community problems.	Team activity	

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
CRP.08.02.02.b. Apply decision-making processes to generate possible solutions to solve workplace and community problems.	Team activity	
CRP.08.03. Performance Indicator: Establish plans to solve workplace and community problems and execute them with resiliency.		
CRP.08.03.02.a. Identify and analyze the elements of a plan for solving workplace and community problems (e.g., budget, timeline, etc.).	Team activity	
CRP.08.03.02.b. Create plans to solve workplace and community problems.	Team activity	
CRP.09.03. Performance Indicator: Demonstrate behaviors that contribute to a positive morale and culture in the workplace and community (e.g., positively influencing others, effectively communicating, etc.).		
CRP.09.03.02.c. Model respectful and purposeful behaviors that contribute to positive morale and culture in the workplace and community (e.g., effectively communicating, recognizing accomplishments of others, etc.).	Sales Team activity Written customer assistance	
CRP.12.01. Performance Indicator: Contribute to team-oriented projects and build consensus to accomplish results using cultural global competence in the workplace and community.		
CRP.12.01.01.a. Differentiate the strengths and talents of all team members needed to complete projects in the workplace and community.	Skills Team activity	
CRP.12.01.01.b. Formulate action plans to complete team-oriented projects in the workplace and community, including plans for personal contributions.	Skills Team activity	
CRP.12.01.02.b. Apply consensus building techniques to accomplish results in team-oriented situations.	Team activity	
CRP.12.02. Performance Indicator: Create and implement strategies to engage team members to work toward team and organizational goals in a variety of workplace and community situations (e.g., meetings, presentations, etc.).		
CRP.12.02.01.b. Assess team dynamics and match strategies to increase team member engagement.	Skills Team activity	
CRP.12.02.02.b. Select strategies to engage team members and apply in a variety of situations.	Skills Team activity	
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.a. Research and examine the characteristics used to identify trees and woody plants.	General knowledge exam Identification	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

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
		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.b. Apply identification techniques to determine the species of a tree or woody plant.	General knowledge exam Identification	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.a. Research and examine the characteristics used to identify herbaceous plants.	General knowledge exam Identification	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.	Identification	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

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
NRS.01.02.03.a. Research and examine the characteristics used to identify wildlife and insects.	Identification	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.01.02.03.b. Apply identification techniques to determine the species of wildlife or insect.	Identification	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.01.05.04.a. Compare and contrast techniques associated with soil management (e.g., soil survey and interpretation, erosion control, etc.).	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
NRS.01.06. Performance Indicator: Apply ecological concepts and principles to living organisms in natural resource systems.		
NRS.01.06.02.a. Research and summarize examples of invasive species.	General knowledge exam	AFNR Career Cluster, Statement 1 AFNR Career Cluster – Animal Systems Pathway, Statement 3

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
		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
NRS.02.05. Performance Indicator: Communicate information to the public regarding topics related to the management, protection, enhancement, and improvement of natural resources.		
NRS.02.05.01.a. Examine ways in which a message regarding natural resources may be communicated to the public through standard media sources (e.g., press, radio, TV, public appearances, etc.).	Team activity	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3 STEM Career Cluster, Statement 2 STEM Career Cluster, Statement 3
NRS.02.05.01.b. Assess the effectiveness of different methods for communicating natural resource messages.	Team activity	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3 STEM Career Cluster, Statement 2 STEM Career Cluster, Statement 3
NRS.02.05.01.c. Devise a strategy for communicating a natural resources message through media.	Team activity	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3 STEM Career Cluster, Statement 2 STEM Career Cluster, Statement 3
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.).	Team activity	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3 STEM Career Cluster, Statement 2 STEM Career Cluster, Statement 3
NRS.02.05.02.b. Assess how to most effectively communicate a message about the conservation, management, enhancement and improvement of natural resources via social media and the Internet.	Team activity	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3 STEM Career Cluster, Statement 2 STEM Career Cluster, Statement 3
NRS.02.05.02.c. Anticipate and predict how messages about the conservation, management, enhancement and improvement of natural resources will change because of social media and the Internet.	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.	Team activity	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3 STEM Career Cluster, Statement 2 STEM Career Cluster, Statement 3
NRS.02.05.03.b. Analyze and summarize examples of 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.	Team activity	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3 STEM Career Cluster, Statement 2 STEM Career Cluster, Statement 3
NRS.02.05.03.c. Create a communication plan to influence the behavior of people, call people to action and instill a sense of civic behavior related to the conservation, management, enhancement and improvement of natural resources.	Team activity	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3 STEM Career Cluster, Statement 2 STEM Career Cluster, Statement 3
NRS.04.02. Performance Indicator: Diagnose plant and wildlife diseases and follow protocols to prevent their spread.		
NRS.04.02.01.b. Analyze a plant disease based on its symptoms, identify if the disease needs to be reported to authorities and determine which authorities it should be reported to.	Identification	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 CCSS.MATH.CONTENT.HSN-Q.A.2 CCSS.MATH.CONTENT.HSN-Q.A.3 HS-LS2-7
NRS.04.03.01.a. Categorize harmful and beneficial insects, as well as signs of insect damage to natural resources.	Identification	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.04.03.01.b. Analyze signs of insect infestation, identify if it needs to be reported to authorities and determine which authorities it should be reported to.	Identification	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

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
		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
PS.01.01. Performance Indicator: Determine the influence of environmental factors on plant growth.		
PS.01.01.02.a. Identify and summarize the effects of air and temperature on plant metabolism and growth.	General knowledge exam	
PS.01.01.03.a. Identify and summarize the effects of water quality on plant growth, (e.g., pH, dissolved solids, etc.).	General knowledge exam	
PS.01.01.03.b. Analyze and describe plant responses to water conditions.	General knowledge exam	
PS.01.02. Performance Indicator: Prepare and manage growing media for use in plant systems		
PS.01.02.01.a. Identify the major components of growing media and describe how growing media support plant growth.	General knowledge exam Propagation or potting	
PS.01.02.01.b. Describe the physical and chemical characteristics of growing media and explain the influence they have on plant growth.	General knowledge exam Propagation or potting	
PS.01.02.02.a. Identify the categories of soil water.	General knowledge exam	
PS.01.02.02.b. Discuss how soil drainage and water-holding capacity can be improved.	General knowledge exam	
PS.01.03. Performance Indicator: Develop and implement a fertilization plan for specific plants or crops.		
PS.01.03.01.a. Identify the essential nutrients for plant growth and development and their major functions (e.g., nitrogen, phosphorous, potassium, etc.).	General knowledge exam Propagation Skills	CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3
PS.01.03.01.b. Analyze the effects of nutrient deficiencies and symptoms and recognize environmental causes of nutrient deficiencies.	General knowledge exam Identification	CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3
PS.01.03.02.a. Discuss the influence of pH and cation exchange capacity on the availability of nutrients.	General knowledge exam	CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3
PS.01.03.04.a. Identify fertilizer sources of essential plant nutrients; explain fertilizer formulations, including organic and inorganic; and describe different methods of fertilizer application.	General knowledge exam	CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
PS.01.03.04.b. Calculate the amount of fertilizer to be applied based on nutrient recommendation and fertilizer analysis.	Skills	CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3
PS.01.03.04.c. Calibrate application equipment to meet plant nutrient needs.	Skills	CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3
PS.01.03.06.a. Summarize the impact of environmental factors on nutrient availability (e.g., moisture, temperature, pH, etc.).	General knowledge exam	CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3
PS.02.01. Performance Indicator: Classify plants according to taxonomic systems.		
PS.02.01.01.a. Identify and summarize systems used to classify plants based on specific characteristics.	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.02.02.01.a. Identify structures in a typical plant cell and summarize the function of plant cell organelles.	General knowledge exam	HS-LS1-4
PS.02.02.02.a. Identify and summarize the components, the types and the functions of plant roots.	General knowledge exam Propagation	HS-LS1-4
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.02.02.04.b. Analyze how leaves capture light energy and summarize the exchange of gases.	General knowledge exam	HS-LS1-4
PS.02.03. Performance Indicator: Apply knowledge of plant physiology and energy conversion to plant systems.		
PS.02.03.01.a. Summarize the importance of photosynthesis to plant life on earth and the process of photosynthesis, including the types (c3, c4, Cam), its stages (e.g., light-dependent and light-independent reactions), and its products and byproducts.	General knowledge exam	HS-LS1-5
PS.03.01. Performance Indicator: Demonstrate plant propagation techniques in plant system activities.		
PS.03.01.01.a. Identify examples of and summarize pollination, cross-pollination and self-pollination of flowering plants.	General knowledge exam	
PS.03.01.03.a. Summarize optimal conditions for asexual propagation and demonstrate techniques used to propagate plants by cuttings, division, separation, layering, budding and grafting.	General knowledge exam Propagation	
PS.03.02. Performance Indicator: Develop and implement a management plan for plant production		
PS.03.02.01.a. Research and summarize the importance of starting with pest- and disease-free propagation material.	Propagation	CCSS.ELA-Literacy.RI.9-10.1 CCSS.ELA-Literacy.RI.9-10.8 CCSS.ELA-Literacy.RST.9-10.3

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
		CCSS.ELA-Literacy.WHST.9-10.2 CCSS.ELA-Literacy.WHST.9-10.4 CCSS.ELA-Literacy.WHST.9-10.9
PS.03.02.01.b. Inspect propagation material for evidence of pests or disease.	Propagation	CCSS.ELA-Literacy.RI.9-10.1 CCSS.ELA-Literacy.RI.9-10.8 CCSS.ELA-Literacy.RST.9-10.3 CCSS.ELA-Literacy.WHST.9-10.2 CCSS.ELA-Literacy.WHST.9-10.4 CCSS.ELA-Literacy.WHST.9-10.9
PS.03.02.02.a. List and summarize the reasons for preparing growing media before planting.	General knowledge exam	CCSS.ELA-Literacy.RI.9-10.1 CCSS.ELA-Literacy.RI.9-10.8 CCSS.ELA-Literacy.RST.9-10.3 CCSS.ELA-Literacy.WHST.9-10.2 CCSS.ELA-Literacy.WHST.9-10.4 CCSS.ELA-Literacy.WHST.9-10.9
PS.03.02.05.a. Summarize the stages of plant growth and the reasons for controlling plant growth.	General knowledge exam	CCSS.ELA-Literacy.RI.9-10.1 CCSS.ELA-Literacy.RI.9-10.8 CCSS.ELA-Literacy.RST.9-10.3 CCSS.ELA-Literacy.WHST.9-10.2 CCSS.ELA-Literacy.WHST.9-10.4 CCSS.ELA-Literacy.WHST.9-10.9
PS.03.02.06.a. Identify and categorize structures and technologies used for controlled atmosphere production of plants.	General knowledge exam	CCSS.ELA-Literacy.RI.9-10.1 CCSS.ELA-Literacy.RI.9-10.8 CCSS.ELA-Literacy.RST.9-10.3 CCSS.ELA-Literacy.WHST.9-10.2 CCSS.ELA-Literacy.WHST.9-10.4 CCSS.ELA-Literacy.WHST.9-10.9
PS.03.03. Performance Indicator: Develop and implement a plan for integrated pest management for plant production.		
PS.03.03.01.a. Identify and categorize plant pests, diseases and disorders.	Identification	
PS.03.03.01.b. Identify and analyze major local weeds, insect pests and infectious and noninfectious plant diseases.	Identification	
PS.03.03.03.a. Identify and summarize pest control strategies associated with integrated pest management and the importance of determining economic threshold.	General knowledge exam	
PS.03.03.04.a. Distinguish between risks and benefits associated with the materials and methods used in plant pest management.	General knowledge exam (nursery/turf) Skills	
PS.03.05. Performance Indicator: Harvest, handle and store crops according to current industry standards.		
PS.03.05.04.a. Identify and categorize plant preparation methods for storing and shipping plants and plant products.	General knowledge exam	CCSS.ELA-Literacy.RST.9-10.3 CCSS.ELA-Literacy.RST.9-10.4

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
		CCSS.ELA-Literacy.WHST.9-10.2a
PS.03.05.05.a. Summarize the reasons for preparing plants and plant products for distribution.	General knowledge exam	CCSS.ELA-Literacy.RST.9-10.3 CCSS.ELA-Literacy.RST.9-10.4 CCSS.ELA-Literacy.WHST.9-10.2a
PS.04.01. Performance Indicator: Evaluating, identifying and preparing plants to enhance an environment.		
PS.04.01.01.a. Identify and categorize plants by their purpose (e.g., floral plants, landscape plants, house plants, etc.).	General knowledge exam Identification	
PS.04.01.02.a. Summarize the applications of design in agriculture and ornamental plant systems.	General knowledge exam	
PS.04.02. Performance Indicator: Create designs using plants.		
PS.04.02.02.a. Identify and categorize tools used for design (e.g., computer landscape software, drawing tools, florist tools, etc.).	General knowledge exam	AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3 AFNR Career Cluster – Plant Systems Pathway, Statement 2 STEM Career Cluster, Statement 4
PS.04.02.02.a. Identify and categorize tools used for design (e.g., computer landscape software, drawing tools, florist tools, etc.).	General knowledge exam	
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.01.02.02.a. Identify the tools, machines and equipment needed to construct and/or fabricate a project in AFNR.	General knowledge exam Identification Skills	HS-PS3-1 HS-PS3-3
PST.01.02.02.b. Calculate the maintenance and purchase cost of tools, machines and equipment used in AFNR.	Skills	HS-PS3-1 HS-PS3-3
PST.01.02.03.a. Examine owner's manuals to classify the types of safety hazards associated with different mechanical systems used in AFNR (e.g., caution, warning, danger, etc.).	Skills	HS-PS3-1 HS-PS3-3
PST.01.02.03.b. Select, maintain and demonstrate the proper use of tools, machines and equipment used in different AFNR related mechanical systems.	Skills	HS-PS3-1 HS-PS3-3
PST.01.02.03.c. Conduct a safety inspection of tools, machines and equipment used in different AFNR related mechanical systems.	Skills	HS-PS3-1 HS-PS3-3
PST.02.01. Performance Indicator: Perform preventative maintenance and scheduled service to maintain equipment, machinery and power units used in AFNR settings.		
PST.02.01.01.a. Maintain the cleanliness and appearance of equipment, machinery and power units used in AFNR power, structural and technical systems to assure proper functionality.	Skills	

Measurements Assessed	Event Activities Addressing Measurements	Related Academic Standards
PST.02.01.02.a. Examine operator's manuals to determine recommendations for servicing filtration systems and maintaining fluid levels on equipment, machinery and power units used in AFNR power, structural and technical systems.	Skills	
PST.02.02. Performance Indicator: Operate machinery and equipment while observing all safety precautions in AFNR settings.		
PST.02.02.02.a. Examine and identify safety hazards associated with equipment, machinery and power units used in AFNR power, structural, and technical systems (e.g., caution, warning, danger, etc.).	Skills	
PST.02.02.02.b. Apply safety principles and applicable regulations to operate equipment, machinery and power units used in AFNR power, structural and technical systems.	Skills	
PST.02.02.02.c. Adjust equipment, machinery and power units for safe and efficient operation in AFNR power, structural and technical systems.	Skills	
PST.04.01. Performance Indicator: Create sketches and plans for AFNR structures.		
PST.04.01.01.a. Interpret and explain the meaning of symbols used in sketches of agricultural structures.	Estimate General knowledge exam	
PST.04.01.01.b. Apply scale measurement and dimension to develop sketches of agricultural structures.	Estimate General knowledge exam	
PST.04.01.02.a. Read and interpret the parts and/or views of plans for agricultural structures.	Estimate General knowledge exam	
PST.04.04.02.b. Construct plans for agricultural structures using current technology (e.g., drafting software, computer-aided design, etc.).	Estimate	
PST.04.02. Performance Indicator: Determine structural requirements, specifications and estimate costs for AFNR structures.		
PST.04.02.01.a. Summarize and categorize the information needed to complete a bill of materials and cost estimate for an AFNR structure.	Estimate	
PST.04.02.01.b. Analyze a project plan to prepare a bill of materials and an estimate of material costs.	Estimate	
PST.04.02.01.c. Create a project cost estimate, including materials, labor and management for an AFNR structure.	Estimate	