



VIRGINIA

FFA ASSOCIATION

Nursery/ Landscape Handbook

2017-2021

Event Purpose

The purpose of the Virginia 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

- **Nursery/Landscape Principles:** To apply nursery and landscape principles and practices as they impact residential, commercial, public and recreational applications.
- **Plant Materials:** To 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:** To demonstrate the ability to identify unhealthy plant conditions due to pests, nutritional/physiological disorders and mechanical/chemical injury.
- **Cultural Practices:** To 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:** To demonstrate knowledge of the principles and techniques of landscape design, estimating and construction.
- **Supplies and Equipment:** To 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:** To demonstrate knowledge of safety practices in nursery and landscape operations.
- **Interpersonal Relations:** To demonstrate skills in oral and written business communications.
- **Business Management:** To demonstrate an understanding of marketing principles and business management as well as proper sales and service skills.
- **Records and Reports:** To demonstrate the ability to prepare estimates and complete financial statements.

Event Rules

- Each team will be comprised of four team members. The four individual scores and the team activity and skills challenge scores will be used to determine the final team score.
- It is highly recommended that participants wear FFA Official Dress for this event.
- 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 certain practicums.
- Any participant in possession of an electronic device other than a calculator and electronic speller, in the event area is subject to disqualification.

Event Format

Each participant must have the following individual tools for both days of competition:

- A clean clipboard
- At least two No. 2 pencils
- A ball-point pen
- A calculator
 - Calculators used in this event should be battery operated, nonprogrammable and silent with large keys and large displays. Calculators may have only these functions: addition, subtraction, multiplication, division, equals, percent, square root, +/- key and one memory register. No other calculators are allowed to be used during the event.
- An architect's scale
- An engineer's scale

Additional items allowed but not required, include the following:

- A pocket-size dictionary or electronic speller and a hand pruner or knife.
- Teams may also be requested to supply one or more laptop computers. Coaches will be notified if laptops are needed in the coaches letter.

INDIVIDUAL EVENTS

PHASE 3: 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 4: IDENTIFICATION OF PLANTS, PESTS, DISORDERS, BENEFICIAL INSECTS, EQUIPMENT AND SUPPLIES (150 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.
- Equipment and supplies will be either an intact item or photograph.
- 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 5: LANDSCAPE ESTIMATING (100 POINTS PER CONTESTANT)

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

- 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.

Scoring

Participant scores are the sum of the three individual phases of the event.

Team scores are the sum of all members scores plus the group portion of the team activity and team challenge.

Possible points are as follows:

PHASE	Member	Team
1. General Knowledge Exam	150	600
2. Identification	150	600
3. Landscape Estimating	100	400
Individual Total	400	
	TEAM TOTAL	1,600

TIEBREAKERS

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

1. General Knowledge Exam
2. Identification
3. Landscape Estimating

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

1. Team General Knowledge Exam score

Awards

Awards will be presented at an awards ceremony to individuals and/or teams based upon their rankings.

References

The following list of references is a guide to team training.

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 event. References other than those listed may be equally valuable resources, along with the many video and computer-based training aids available.

NATIONAL FFA CORE CATALOG

- Nursery/Landscape CDE materials: <http://shop.ffa.org>
- CDE Q&A's: [FFA.org](http://www.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, NJ. ISBN 0130364134
- Introductory Horticulture. Current edition. H. Edward Reiley and Carroll L. Shry, Jr. Clifton Park, NY: Delmar Cengage Learning. ISBN 9781435480391
- Ornamental Horticulture. Current edition. Jack Ingels. Delmar Publishers Inc., Albany, NY. 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, NJ. ISBN 0813432162

LANDSCAPE

- Landscaping Principles and Practices. Current edition. Jack Ingels. Delmar Publishers Inc., Albany, NY. ISBN 13: 9781428376410
- Landscaping Construction. Current edition. David Sauter. Delmar Publishers Inc., Albany, NY. ISBN 143549718X
- Introduction to Landscaping: Design, Construction, and Maintenance. Current edition. Ronald J. Biondo and Charles B. Schroeder. Prentice-Hall, Inc., Englewood Cliffs, NJ. 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 <http://www.landscapetechnician.net>

TURF

- Turfgrass Science and Management. Current edition. Robert D. Emmons. Delmar Publishers Inc., Albany, NY. 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 http://americanhort.org/documents/ANSI_Nursery_Stock_Standards_AmericanHort_2014.pdf)

SECONDARY REFERENCES

- Practical Horticulture. Current edition. Laura W. Rice and Robert P. Rice. Prentice-Hall, Inc., Englewood Cliffs, NJ. ISBN 0135038669
- Landscape Design: A Practical Approach. Current edition. Leroy G. Hannebaum. PrenticeHall, Inc., Upper Saddle River, NJ. ISBN 0130105813
- Manual of Woody Landscape Plants. Current edition. Michael A. Dirr. Stipes Publishing Co., Champaign, IL. 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, NJ. ISBN 0138579962
- Landscape Plants, Their Identification, Culture, and Use. Current edition. Ferrell M. Bridwell. Delmar Thomson Learning, Albany, NY. 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, OK. ISBN 0961310910
- Manual of Herbaceous Ornamental Plants. Current edition. Steven M. Still. Stipes Publishing Co., Champaign, IL. 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, IL. ISBN 978-1-58874-868-3.
- Landscape Construction Procedures, Techniques, and Design. Current edition. Floyd Giles. Stipes Publishing Co., Champaign, IL. 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, NJ. ISBN 9780471736196.

TRADE PERIODICALS

- American Nurseryman. American Nurserymen Publishing Co., Chicago, IL. <http://www.amerinursery.com/>
- Grounds Maintenance. Primedia, Overland Park, KS., www.grounds-mag.com/
- Turf Magazine, plus several other on-line titles. Moose River Media LLC. www.turfmagazine.com/
- Interiorscape.com: A Forum for Interior Plantscape Professionals. www.interiorscape.com/

INDUSTRY CATALOGS

Many horticultural supply company catalogs can be utilized for reference support on tools, equipment and supplies that may not be illustrated in other sources.

- A.M. Leonard, Inc., 665 Spiker Road, Piqua, OH 45356 (513/773-2697 or <http://www.amleo.com/index1.html>)
- Hummert International, 4500 Earth City Expressway, Earth City, Mo. 63045, 800-325-3055 /phone <https://www.hummert.com>

WEBSITES AND PROBLEM SAMPLES

Visit the National FFA website at <http://www.ffa.org> for information on career development events, access to prior-year event materials and links to additional study aids. 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

NAME			MEMBER NUMBER		
CHAPTER			STATE		
No.	Botanical Name	Common Name	No.	Botanical Name	Common Name
101	<i>Abelia x grandiflora</i>	Glossy Abelia	130	<i>Echinaceae purpurea</i>	Purple Coneflower
102	<i>Abies concolor</i>	White Fir	131	<i>Epipremnum spp.</i>	Pothos
103	<i>Acer palmatum cv.</i>	Japanese Maple	132	<i>Euonymus alatus</i>	Winged Euonymus
104	<i>Acer platanoides cv.</i>	Norway Maple	133	<i>Euonymus fortunei cv.</i>	Wintercreeper
105	<i>Acer rubrum cv.</i>	Red Maple	134	<i>Fagus sylvatica cv.</i>	European Beech
106	<i>Acer saccharum cv.</i>	Sugar Maple	135	<i>Festuca spp. and cv.</i>	Fescue
107	<i>Ajuga reptans cv.</i>	Carpet Bugle	136	<i>Ficus benjamina</i>	Benjamin Fig
108	<i>Antirrhinum majus cv.</i>	Snapdragon	137	<i>Ficus elastica 'Decora'</i>	Decora Rubber Plant
109	<i>Aquilegia x hybrida cv.</i>	Columbine	138	<i>Forsythia x intermedia cv.</i>	Border Forsythia
110	<i>Amelanchier arborea</i>	Downy Serviceberry	139	<i>Fraxinus americana cv.</i>	White Ash
111	<i>Astilbe hybrid cv.</i>	Astilbe	140	<i>Gaillardia aristata cv.</i>	Common Blanketflower
112	<i>Begonia semperflorens-cultorum</i>	Wax Begonia	141	<i>Gardenia jasminoides 'Fortuniana'</i>	Common Gardenia
113	<i>Berberis x mentorensis</i>	Mentor Barberry	142	<i>Ginkgo biloba</i>	Ginkgo, Maidenhair Tree
114	<i>Betula nigra</i>	River Birch	143	<i>Gleditsia triacanthos inermis cv.</i>	Thornless Honeylocust
115	<i>Brassaia actinophylla</i>	Schefflera, Octopus Tree	144	<i>Hedera helix cv.</i>	English Ivy
116	<i>Buxus microphylla cv.</i>	Littleleaf Boxwood	145	<i>Hemerocallis spp. and cv.</i>	Day lily
117	<i>Camellia japonica cv.</i>	Common Camellia	146	<i>Hosta x hybrida cv.</i>	Plaintain Lily
118	<i>Cedrus atlantica 'Glauca'</i>	Blue Atlas Cedar	147	<i>Hydrangea quercifolia</i>	Oakleaf Hydrangea
119	<i>Cercis canadensis</i>	Redbud	148	<i>Hydrangea macrophylla</i>	Bigleaf Hydrangea
120	<i>Chaenomeles speciosa cv.</i>	Japanese (Flowering) Quince	149	<i>Ilex cornuta cv.</i>	Chinese Holly
121	<i>Clematis hybrid</i>	<i>Clematis</i>	150	<i>Ilex crenata cv.</i>	Japanese Holly
122	<i>Cornus florida cv.</i>	Flowering Dogwood	151	<i>Ilex x meserveae cv.</i>	Meserve Holly
123	<i>Cotoneaster dammeri</i>	Bearberry Cotoneaster	152	<i>Impatiens hybrid cv.</i>	Impatiens
124	<i>Cotoneaster divaricatus</i>	Spreading Cotoneaster	153	<i>Iris x germanica florentina cv.</i>	Bearded Iris
125	<i>Crataegus phaenopyrum</i>	Washington Hawthorn	154	<i>Juniperus chinensis cv.</i>	Chinese Juniper
126	<i>Cynodon dactylon cv</i>	Bermudagrass	155	<i>Juniperus horizontalis cv.</i>	Creeping Juniper
127	<i>Dieffenbachia maculata cv.</i>	Spotted Dumb Cane	156	<i>Lagerstroemia indica cv.</i>	Crape Myrtle
128	<i>Dracaena deremensis 'Warneckii'</i>	Striped Dracaena	157	<i>Leucanthemum x superbum cv.</i>	Shasta Daisy
129	<i>Dracaena fragens 'Massangeana'</i>	Corn Plant	158	<i>Liquidambar styraciflua</i>	Sweet Gum
			159	<i>Liriodendron tulipifera</i>	Tuliptree

No.	Botanical Name	Common Name
160	<i>Liriope spp. cv.</i>	Lilyturf
161	<i>Lonicera japonica</i> 'Halliana'	Hall's Japanese Honeysuckle
162	<i>Magnolia grandiflora cv.</i>	Southern Magnolia
163	<i>Magnolia x soulangiana cv.</i>	Chinese (Saucer) Magnolia
164	<i>Mahonia aquifolia cv.</i>	Oregon Grape
165	<i>Malus spp. and cv.</i>	Flowering Crabapple
166	<i>Myrica pensylvanica</i>	Bayberry
167	<i>Nandina domestica</i>	Heavenly Bamboo
168	<i>Narcissus pseudonarcissus cv.</i>	Daffodil
169	<i>Nyssa sylvatica</i>	Sour (Black) Gum
170	<i>Pachysandra terminalis</i>	Japanese Spurge
171	<i>Paeonia hybrid cv.</i>	Peony
172	<i>Parthenocissus tricuspidata</i>	Boston Ivy
173	<i>Pelargonium x hortorum cv.</i>	Zonal Geranium
174	<i>Pennisetum ruppelia</i>	Fountain Grass
175	<i>Petunia x hybrida cv.</i>	Petunia
176	<i>Philodendron scandens oxycardium</i>	Heartleaf Philodendron
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 sylvestris</i>	Scotch Pine
183	<i>Pinus thunbergiana</i>	Japanese Black Pine
184	<i>Platanus x acerifolia</i>	London Planetree
185	<i>Poa pratensis cv.</i>	Kentucky Bluegrass
186	<i>Podocarpus macrophyllus</i>	Southern Yew
187	<i>Potentilla fruticosa cv.</i>	Shrubby Cinquefoil

No.	Botanical Name	Common Name
188	<i>Prunus laurocerasus cv.</i>	Cherry Laurel
189	<i>Prunus serrulata</i> 'Kwanzan'	Kwanzan Japanese Flowering Cherry
190	<i>Pyracantha coccinea cv.</i>	Firethorn
191	<i>Quercus alba</i>	White Oak
192	<i>Quercus palustris</i>	Pin Oak
193	<i>Quercus rubra</i>	Red Oak
194	<i>Rhododendron x catawbiense</i>	Catawba Hybrid Rhododendron
195	<i>Rhododendron Hybrid</i>	Exbury Hybrid Azalea
196	<i>Rosa spp.</i>	Landscape/Shrub Rose cv.
197	<i>Salvia nemorosa cv.</i>	Meadow Sage
198	<i>Sedum spp.</i>	Sedum
199	<i>Solenostemon scutellarioides</i>	Coleus
200	<i>Sorbus aucuparia</i>	European Mountain Ash
201	<i>Spiraea x bumalda</i>	Bumalda Spirea
202	<i>Syringa vulgaris cv.</i>	Common Lilac
203	<i>Tagetes spp. cv.</i>	Marigold
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>Tulipa spp. cv.</i>	Tulip
210	<i>Verbena x hybrida cv.</i>	Garden Verbena
211	<i>Viburnum x burkwoodii</i>	Burkwood Viburnum
212	<i>Viburnum trilobum</i>	American Cranberrybush Viburnum
213	<i>Vinca minor cv.</i>	Periwinkle
214	<i>Viola x wittrockiana cv.</i>	Pansy
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
Diseases	
227	Anthraco nose
228	Apple Scab
229	Black Spot
230	Botrytis
231	Canker
232	Cedar-Apple Rust
233	Crown Gall
234	Fireblight
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

Equipment and Supplies Identification

No.	Item Name
260	anvil-and-blade pruner
261	ball cart (B&B truck)
262	bark mulch
263	bow saw
264	broadcast (cyclone) spreader
265	bubbler head, irrigation
266	bulb planter
267	bunker rake
268	burlap
269	compressed air sprayer
270	core aerifier
271	chain saw
272	cut-off machine
273	drip emitter, irrigation
274	dry-lock wall block
275	edger (power or hand)
276	edging
277	erosion netting
278	fertilizer injector
279	fertilizer tablet
280	garden (spading) fork
281	garden (bow) rake
282	grafting band
283	grafting knife
284	granular fertilizer
285	gravity (drop) spreader
286	ground/pelleted limestone
287	hedge shears

No.	Item Name
288	hoe
289	hook-and-blade pruners
290	hose-end repair fitting
291	hose-end sprayer
292	hose-end washer
293	hose repair coupling
294	impact sprinkler
295	irrigation ring tool
296	landscape fabric
297	leaf rake
298	loppers
299	mattock
300	measuring wheel
301	mist nozzle (mist bed)
302	mower blade balancer
303	nursery container
304	oscillating sprinkler
305	peat moss
306	pick axe
307	planting/earth/soil auger
308	pole pruner
309	polyethylene pipe
310	pop-up irrigation head
311	post-hole digger
312	power blower
313	power hedge trimmer
314	pot-in-pot units
315	pump sprayer

No.	Item Name
316	propagation mat
317	pruning saw
318	quick coupler
319	quick coupler head adapter
320	reel mower
321	resin-coated fertilizer
322	rotary mower
323	rototiller
324	round point shovel
325	scoop shovel
326	shade fabric
327	sharpening stone
328	siphon proportioner
329	soaker hose
330	soil sampling tube
331	solenoid valve
332	spade
333	sphagnum moss
334	square point (flat) shovel
335	string trimmer
336	thatch rake
337	tree caliper
338	tree wrap
339	trowel
340	vertical mower
341	water breaker
342	wire tree basket

Agriculture, Food and Natural Resources Content Standards

MEASUREMENT ASSESSED	Where measured in event	Academic Content Standards Addressed
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.).	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.).	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.).	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

<p>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.).</p>	<p>Exam</p>	<p>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</p>
<p>ABS.04.01. Performance Indicator: Analyze characteristics and planning requirements associated with developing business plans for different types of AFNR businesses.</p>		
<p>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).</p>	<p>Exam</p>	<p>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</p>
<p>ABS.04.03. Performance Indicator: Identify and apply strategies to manage or mitigate risk.</p>		
<p>ABS.04.03.01.a. Research and classify sources of risk for an AFNR business.</p>	<p>Exam</p>	<p>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</p>
<p>ABS.05.02. Performance Indicator: Assess and apply sales principles and skills to accomplish AFNR business objectives.</p>		
<p>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.).</p>	<p>Verbal, Team Activity</p>	<p>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</p>
<p>ABS.05.03. Performance Indicator: Assess marketing principles and develop marketing plans to accomplish AFNR business objectives.</p>		
<p>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.).</p>	<p>Verbal, Team Activity</p>	<p>AFNR Career Cluster – Agribusiness Systems Pathway, Statement 4 CCSS.ELA-LITERACY.L.9-10.6 CCSS.ELA-LITERACY.L.11-12.6</p>

		<p>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 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</p>
<p>ABS.05.03.01.b. Assess alternative marketing strategies as related to marketing principles for AFNR businesses (e.g. value-adding, branding, niche marketing, etc.).</p>	<p>Team Activity</p>	<p>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 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</p>
<p>ABS.05.03.02.a. Examine and categorize strategies used in marketing programs for AFNR businesses (e.g., Internet, direct to customer, social media, etc.).</p>	<p>Team Activity</p>	<p>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 Buying Goods & Services: Benchmarks: Grade 12, Statements 1</p>

		<p>Buying Goods & Services: Benchmarks: Grade 12, Statements 3</p> <p>Buying Goods & Services: Benchmarks: Grade 12, Statements 4</p> <p>Buying Goods & Services: Benchmarks: Grade 12, Statements 7</p>
<p>ABS.05.03.02.b. Compare and contrast the strategies of marketing for products and services used in AFNR businesses (e.g., direct marketing, commodities, etc.).</p>	<p>Team Activity</p>	<p>AFNR Career Cluster – Agribusiness Systems Pathway, Statement 4</p> <p>CCSS.ELA-LITERACY.L.9-10.6</p> <p>CCSS.ELA-LITERACY.L.11-12.6</p> <p>CCSS.ELA-LITERACY.RST.9-10.4</p> <p>CCSS.ELA-LITERACY.RST.11-12.4</p> <p>CCSS.ELA-LITERACY.W.9-10.2</p> <p>CCSS.ELA-LITERACY.W.11-12.2</p> <p>CCSS.ELA-LITERACY.RH.9-10.7</p> <p>CCSS.ELA-LITERACY.RH.11-12.7</p> <p>CCSS.ELA-LITERACY.SL.9-10.6</p> <p>CCSS.ELA-LITERACY.SL.11-12.6</p> <p>Buying Goods & Services: Benchmarks: Grade 12, Statements 1</p> <p>Buying Goods & Services: Benchmarks: Grade 12, Statements 3</p> <p>Buying Goods & Services: Benchmarks: Grade 12, Statements 4</p> <p>Buying Goods & Services: Benchmarks: Grade 12, Statements 7</p>
<p>ABS.05.03.02.c. Devise plans to implement and evaluate marketing strategies for products and services used in AFNR businesses.</p>	<p>Team Activity</p>	<p>AFNR Career Cluster – Agribusiness Systems Pathway, Statement 4</p> <p>CCSS.ELA-LITERACY.L.9-10.6</p> <p>CCSS.ELA-LITERACY.L.11-12.6</p> <p>CCSS.ELA-LITERACY.RST.9-10.4</p> <p>CCSS.ELA-LITERACY.RST.11-12.4</p> <p>CCSS.ELA-LITERACY.W.9-10.2</p> <p>CCSS.ELA-LITERACY.W.11-12.2</p> <p>CCSS.ELA-LITERACY.RH.9-10.7</p> <p>CCSS.ELA-LITERACY.RH.11-12.7</p> <p>CCSS.ELA-LITERACY.SL.9-10.6</p> <p>CCSS.ELA-LITERACY.SL.11-12.6</p> <p>Buying Goods & Services: Benchmarks: Grade 12, Statements 1</p> <p>Buying Goods & Services: Benchmarks: Grade 12, Statements 3</p> <p>Buying Goods & Services: Benchmarks: Grade 12, Statements 4</p> <p>Buying Goods & Services: Benchmarks: Grade 12, Statements 7</p>
<p>ABS.05.03.03.a. Research and define the purpose, components and developmental processes of marketing plans for AFNR businesses.</p>	<p>Team Activity</p>	<p>AFNR Career Cluster – Agribusiness Systems Pathway, Statement 4</p> <p>CCSS.ELA-LITERACY.L.9-10.6</p> <p>CCSS.ELA-LITERACY.L.11-12.6</p>

		<p>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 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</p>
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.	Skills, ID	
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.	Exam	<p>AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3</p>

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.).	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	
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, Written Customer Assistance	
CRP.02.02.01.b. Assess workplace problems and distinguish the most appropriate technical concepts to apply.	Written Customer Assistance, 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, Written Customer Assistance	
CRP.02.02.02.b. Assess community problems and identify the most appropriate technical concepts to apply.	Team Activity, Written Customer Assistance	
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.).	Sales, Written 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.).	Sales	
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.	Sales	
CRP.04.02. Performance Indicator: Produce clear, reasoned and coherent written communication in formal and informal settings.		
CRP.04.02.02.b. Apply techniques for ensuring clarity, logic and coherence to edit written communications (e.g., emails, reports, presentations, technical documents, etc.).	Written Customer Assistance	
CRP.04.02.02.c. Compose clear and coherent written documents (e.g., agendas, audio-visuales, drafts, forms, etc.) for formal and informal settings.	Written 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.).	Exam	
CRP.04.03.01.b. Apply active listening strategies (e.g., be attentive, observe non-verbal cues, ask clarifying questions, etc.).	Sales, Team Activity	
CRP.04.03.02.c. Model active listening strategies in formal and informal settings.	Sales, Team Activity	
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.		
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.	Team Activity, Skills	
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, Written Customer Assistance	
CRP.08.02.02.a. Identify and summarize steps in the decision-making process to solve workplace and community problems.	Team Activity, Written Customer Assistance	
CRP.08.02.02.b. Apply decision-making processes to generate possible solutions to solve workplace and community problems.	Team Activity, Written Customer Assistance	

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.).	Team Activity, Written Customer Assistance, Sales	
CRP.12.01. Performance Indicator: Contribute to team-oriented projects and builds 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.	Team Activity, Skills	
CRP.12.01.01.b. Formulate action plans to complete team-oriented projects in the workplace and community, including plans for personal contributions.	Team Activity, Skills	
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.	Team Activity, Skills	
CRP.12.02.02.b. Select strategies to engage team members and apply in a variety of situations.	Team Activity, Skills	
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.ID,	Exam	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

		<p>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</p>
<p>NRS.01.02.01.b. Apply identification techniques to determine the species of a tree or woody plant.</p>	<p>Exam</p>	<p>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</p>
<p>NRS.01.02.02.a. Research and examine the characteristics used to identify herbaceous plants. ID,</p>	<p>Exam</p>	<p>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</p>
<p>NRS.01.02.02.b. Apply identification techniques to determine the species of an herbaceous plant.</p>	<p>ID</p>	<p>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</p>

<p>NRS.01.02.03.a. Research and examine the characteristics used to identify wildlife and insects.</p>	<p>ID</p>	<p>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</p>
<p>NRS.01.02.03.b. Apply identification techniques to determine the species of wildlife or insect.</p>	<p>ID</p>	<p>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</p>
<p>NRS.01.05. Performance Indicator: Apply ecological concepts and principles to terrestrial natural resource systems.</p>		
<p>NRS.01.05.04.a. Compare and contrast techniques associated with soil management (e.g., soil survey and interpretation, erosion control, etc.).</p>	<p>Exam</p>	<p>AFNR Career Cluster, Statement 1 AFNR Career Cluster – Animal Systems Pathway, Statement 3 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.MATH.CONTENT.HSS-ID.A.1 CCSS.MATH.CONTENT.HSS-IC.A.1 CCSS.MATH.CONTENT.HSS-IC.B.6 HS-ESS3-4 HS-ESS3-2</p>
<p>NRS.01.06. Performance Indicator: Apply ecological concepts and principles to living organisms in natural resource systems.</p>		
<p>NRS.01.06.02.a. Research and summarize examples of invasive species.</p>	<p>Exam</p>	<p>AFNR Career Cluster, Statement 1 AFNR Career Cluster – Animal Systems Pathway, Statement 3</p>

		<p>AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3</p> <p>CCSS.ELA-LITERACY.RST.11-12.1</p> <p>CCSS.ELA-LITERACY.RST.11-12.8</p> <p>CCSS.ELA-LITERACY.WHST.9-10.2</p> <p>CCSS.ELA-LITERACY.WHST.11-12.2</p> <p>CCSS.ELA-LITERACY.WHST.9-10.5</p> <p>CCSS.ELA-LITERACY.WHST.11-12.5</p> <p>CCSS.ELA-LITERACY.WHST.9-10.7</p> <p>CCSS.ELA-LITERACY.WHST.11-12.7</p> <p>CCSS.ELA-LITERACY.WHST.9-10.9</p> <p>CCSS.ELA-LITERACY.WHST.11-12.9</p> <p>HS-LS4-4</p> <p>HS-LS4-6</p> <p>HS-ESS3-4</p>
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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	<p>AFNR Career Cluster, Statement 2</p> <p>AFNR Career Cluster, Statement 3</p> <p>STEM Career Cluster, Statement 2</p> <p>STEM Career Cluster, Statement 3</p>
NRS.02.05.01.b. Assess the effectiveness of different methods for communicating natural resource messages.	Team Activity	<p>AFNR Career Cluster, Statement 2</p> <p>AFNR Career Cluster, Statement 3</p> <p>STEM Career Cluster, Statement 2</p> <p>STEM Career Cluster, Statement 3</p>
NRS.02.05.01.c. Devise a strategy for communicating a natural resources message through media.	Team Activity	<p>AFNR Career Cluster, Statement 2</p> <p>AFNR Career Cluster, Statement 3</p> <p>STEM Career Cluster, Statement 2</p> <p>STEM Career Cluster, Statement 3</p>
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	<p>AFNR Career Cluster, Statement 2</p> <p>AFNR Career Cluster, Statement 3</p> <p>STEM Career Cluster, Statement 2</p> <p>STEM Career Cluster, Statement 3</p>
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	<p>AFNR Career Cluster, Statement 2</p> <p>AFNR Career Cluster, Statement 3</p> <p>STEM Career Cluster, Statement 2</p> <p>STEM Career Cluster, Statement 3</p>
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	<p>AFNR Career Cluster, Statement 2</p> <p>AFNR Career Cluster, Statement 3</p> <p>STEM Career Cluster, Statement 2</p> <p>STEM Career Cluster, Statement 3</p>

<p>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.</p>	<p>Team Activity</p>	<p>AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3 STEM Career Cluster, Statement 2 STEM Career Cluster, Statement 3</p>
<p>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.</p>	<p>Team Activity</p>	<p>AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3 STEM Career Cluster, Statement 2 STEM Career Cluster, Statement 3</p>
<p>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.</p>	<p>Team Activity</p>	<p>AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3 STEM Career Cluster, Statement 2 STEM Career Cluster, Statement 3</p>
<p>NRS.04.02. Performance Indicator: Diagnose plant and wildlife diseases and follow protocols to prevent their spread.</p>		
<p>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.</p>	<p>ID</p>	<p>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</p>
<p>NRS.04.03.01.a. Categorize harmful and beneficial insects, as well as signs of insect damage to natural resources.</p>	<p>ID</p>	<p>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</p>
<p>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.</p>	<p>ID</p>	<p>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</p>

		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.	Exam	
PS.01.01.03.a. Identify and summarize the effects of water quality on plant growth, (e.g., pH, dissolved solids, etc.).	Exam	
PS.01.01.03.b. Analyze and describe plant responses to water conditions.	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.	Exam, Prop/Pot	
PS.01.02.01.b. Describe the physical and chemical characteristics of growing media and explain the influence they have on plant growth.	Exam, Prop/Pot	
PS.01.02.02.a. Identify the categories of soil water.		
PS.01.02.02.b. Discuss how soil drainage and water-holding capacity can be improved.	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.).	Exam, Prop, 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.	Exam, ID	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.	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.	Exam	CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3
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.).	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.	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.	Exam	HS-LS1-4
PS.02.02.02.a. Identify and summarize the components, the types and the functions of plant roots.	Exam, Prop	HS-LS1-4
PS.02.02.03.a. Identify and summarize the components and the functions of plant stems.	Exam	HS-LS1-4
PS.02.02.04.a. Research and summarize leaf morphology and the functions of leaves.	Exam	HS-LS1-4
PS.02.02.04.b. Analyze how leaves capture light energy and summarize the exchange of gases.	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.	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.	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.	Exam, Prop	
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.	Prop	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.03.02.01.b. Inspect propagation material for evidence of pests or disease.	Prop	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.	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. 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. 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.	ID	
PS.03.03.01.b. Identify and analyze major local weeds, insect pests and infectious and noninfectious plant diseases.	ID	

PS.03.03.03.a. Identify and summarize pest control strategies associated with integrated pest management and the importance of determining economic threshold.	Exam	
PS.03.03.04.a. Distinguish between risks and benefits associated with the materials and methods used in plant pest management.	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.	Exam	CCSS.ELA-Literacy.RST.9-10.3 CCSS.ELA-Literacy.RST.9-10.4 CCSS.ELA-Literacy.WHST.9-10.2a
PS.03.05.05.a. Summarize the reasons for preparing plants and plant products for distribution.	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.).	Exam, ID	
PS.04.01.02.a. Summarize the applications of design in agriculture and ornamental plant systems.	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.).	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.).	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.	Exam, Skills, ID	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	
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.	Exam, Estimate	
PST.04.01.01.b. Apply scale measurement and dimension to develop sketches of agricultural structures.	Exam, Estimate	
PST.04.01.02.a. Read and interpret the parts and/or views of plans for agricultural structures.	Exam, Estimate	
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	