

WASHINGTON

FFA ASSOCIATION

Agronomy Career Development Event Handbook

Revised 2023

Purpose & Objectives

Purpose

The purpose of the Washington FFA Agronomy Career Development Event is to create interest and promote understanding in agronomy by providing opportunities for recognition through the demonstration of skills and proficiencies. It also gives students an opportunity to explore career opportunities available in agronomy and encourages students to pursue careers in agronomy.

Objectives

Through participation in the national event, participants will be able to:

- Demonstrate knowledge and skills used in agronomic sciences.
- Explore career opportunities, skills and proficiencies in the agronomy industry.
- Determine the ability to identify agronomic:
 - Crops,
 - Weeds,
 - Seeds,
 - Insects,
 - Diseases,
 - Plant nutrient deficiencies,
 - Plant disorders,
 - Crop grading and pricing,
 - Equipment, and
 - Local, state and global issues.
- Evaluate a scenario and develop a crop management plan including crop selection, production and marketing.
- Demonstrate understanding of sustainable agriculture and environmental stewardship through the use of integrated pest management and best management practices.

Event Rules

- Five members will be on each team. All five members will be scored, and the top four members' scores will count toward the team total.
- It is highly recommended that participants wear official FFA dress for this event.
- All team members will participate in the team activity portion of the event
- Individual event components will be completed on Judging Card scantron [#708-4 Agronomy](#)
- Under no circumstances will a participant be allowed to destroy any of the items in the identification portion of the practicums. Any infractions of this rule will be sufficient to eliminate a team from the event.

WRITTEN MATERIAL

- All written material will be furnished for the event. No written materials such as tests, problems and worksheets should be removed from the site.
- Any participant in possession of an electronic device in the event area is subject to disqualification.

Event Format

The event will be composed of both individual and team activities. Individual activities will include an individual knowledge exam as well as rotations including identification, soils, commodities evaluation, pest management, agronomic issues, and equipment & machinery identification. A team activity will also be included which will focus on developing solutions to agronomic scenario.

Equipment

Materials students must provide:

- Clean, free of notes clipboard
- Two sharpened No. 2 pencils
- Non-programmable electronic calculator

The calculators used during the event are to be battery operated, non-programmable, silent with large keys and large displays. The calculators should only have 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.

Team Activity

The team will be provided with a scenario of an agronomic situation and will be asked to evaluate and answer questions based on a management plan in 30 minutes. The questions will be answered via multiple-choice, possibly on a scantron. Team members will also give a presentations on their findings. There are 400 points possible for the team activity.

Each year the team event scenario will be chosen from a cropping region of the country. Cost information may be utilized for various practices such as irrigation, machinery, harvesting, seedbed preparation, storage and loan interest rates, as well as fertilizers and chemicals. (This list is not inclusive.) The students may be asked to figure profit or loss based on this information.

Resources provided for the team activity may include cost sheets, seed tag information, tillage practices, pesticide labels, extension bulletins, fertility reports, tissue analysis, contract information, water management, seeding rates, variety information, trial data and application information including nozzle selection, chemigation, fertigation and aerial application.

Individual Activities

GENERAL KNOWLEDGE EXAMINATION (100 POINTS)

Fifty objective multiple-choice questions will be given to each participant. Questions may include, but are not limited to, the following areas: general agronomy questions, plant and soils science, cost sheets, seed tag information, tillage practices, pesticide labels, extension bulletins, fertility reports, tissue analysis, contract information, water management, seeding rates, variety information, trial data and application/calibration information for nozzle selection, chemigation, fertigation and aerial application. The test will be based off a test bank of 350 questions based on the knowledge exams provided from National FFA Website which includes 2013-2019.

IDENTIFICATION (150 points)

Students will identify 50 weed and/or crop plants and/or seeds. Plants may be presented in any stage of growth following emergence. The list of possible specimens is in the reference section of the handbook.

SOILS (100 POINTS)

Each participant will be responsible for the following activities related to soils:

- Identify various soil structures: web soil survey, custom soil resource report, soil maps.
- Analyze web soil survey data and answer questions related to:
 - Relative drainage (e.g., poor, moderate, well)
 - Relative topographic position (e.g., summit, slope, depression)
 - Depth to water table
 - Frost free period
 - Identify the USDA land capability classes and answer problem solving questions related to various classes.
 - Use soil survey to locate specific sites, use of suggested soil spots and questions related to the soil survey map.

PEST MANAGEMENT (200 POINTS)

Disorders (100 points)

- Ten samples will be identified according to category, causal agent and damage location. Refer to the Agronomic Disorders Practicum Scorecard for the category, agent and damage location lists.

Insect Identification (100 points)

- Ten samples will be identified according to insect name, economic impact and mouth part. An insect list of names only will be provided to contestants for the event. A detailed list can be found in the reference section of this handbook.

EQUIPMENT & MACHINERY IDENTIFICATION (100 POINTS)

- Participants will be required to identify 20 specimens from the list in the reference section of the handbook. Samples may appear as actual equipment, scale models, toys or pictures. Major components that are unique to a certain piece of equipment can also be used.
- Identification samples will be of the complete item. There will be no identification of individual parts/pieces.

FERTILIZER PROBLEM SOLVING (100 POINTS)

Participants will be given a scenario where they will have to calculate fertilizer application rate and costs for field(s). This will involve students doing math-based calculations.

Scoring

Participant scores are the sum of the individual phases of the event, and team scores are the sum of the four participant scores plus the team activity.

ACTIVITIES	Individual Points	Team Points
Written Exam	100	400
Identification	150	600
Soils	100	400
Pest Management	200	800
Equipment/Machinery ID	100	400
Fertilizer Problem Solving	100	400
Team Activity		400
MAXIMUM TOTAL POINTS	750	3400

TIEBREAKERS

Team

If ties occur for team awards the following events will be used to determine the placings:

1. Team Activity
2. Total Written Exam

Individual

If ties occur for individual awards the following events will be used to determine the placings:

1. Written Exam
2. Plant and Seed Identification
3. Soils

References

This list of references is not intended to be all inclusive.

Other sources may be utilized, and teachers are encouraged to make use of the very best instructional materials available. Make sure to use discretion when selecting website references by only using reputable, proven sites. The following list contains references that may prove helpful during event preparation. The most current edition of resources will be used.

Past CDE materials and other resources <https://www.FFA.org/participate/cdes/agronomy>

PLANT IDENTIFICATION

- Flash cards for both seeds and plants are available through Wards Natural Science Establishment <https://wardsci.com/store/>
- Weeds of the Northeast, Comstock Books, by Richard H. Uva (Author), Joseph C. Neal (Author), Joseph M. Ditomaso (Author).
- Weeds of the Great Plains, Nebraska Department of Agriculture by James L Stubbendieck (Author).
- Weeds of the West, University of Wyoming Extension, by Tom D. Whitson (Editor).
- Common Weed Seedlings of the North Central States, Michigan State University Extension.
- Sunset Western Garden Book.
- An Illustrated Guide to Arizona Weeds, University of Arizona, <https://www.uapress.arizona.edu/onlinebks/WEEDS/TITLWEED.HTM>
- Weeds of California and Other Western States University of California.
- Interactive Encyclopedia of Weeds of North America, North Central Weed Science Society.
- <http://plants.usda.gov/java/>
- At <http://www.efita.org/Agriculture/Pests-and-Diseases/Weeds/Virginia-Tech-Weed-Identification-Guide-details-2207.html> click on site listed as <http://www.ppws.vt.edu/weedindex.html>
- http://www.ipm.ucanr.edu/PMG/weeds_multi.html
- <http://wssa.net/weed/weed-identification/>

SEED IDENTIFICATION

- Illustrated Taxonomy Manual of Weed Seeds, North Central Weed Science Society.
- Weed Seeds of the Great Plains, University Press of Kansas.
- <http://www.oardc.ohio-state.edu/seedid/> At site, enter common name or scientific name to find seed.
- <http://plants.usda.gov/java/>

MACHINERY IDENTIFICATION

Resources for machinery identification can be obtained online from various equipment manufacturers. A visit to an implement dealer in your area would be recommended. Farm toys can also be used.

DISEASE / DISORDER

- <http://plantdiseasehandbook.tamu.edu/>

INSECTS:

- http://pest.ca.uky.edu/EXT/master_gardener/entbasics/mouthparts/mouthparts.shtml

SOILS:

- <http://www.nrcs.usda.gov/wps/portal/nrcs/soilsurvey/soils/survey/state/>

TEAM EVENT

- www.cdms.net

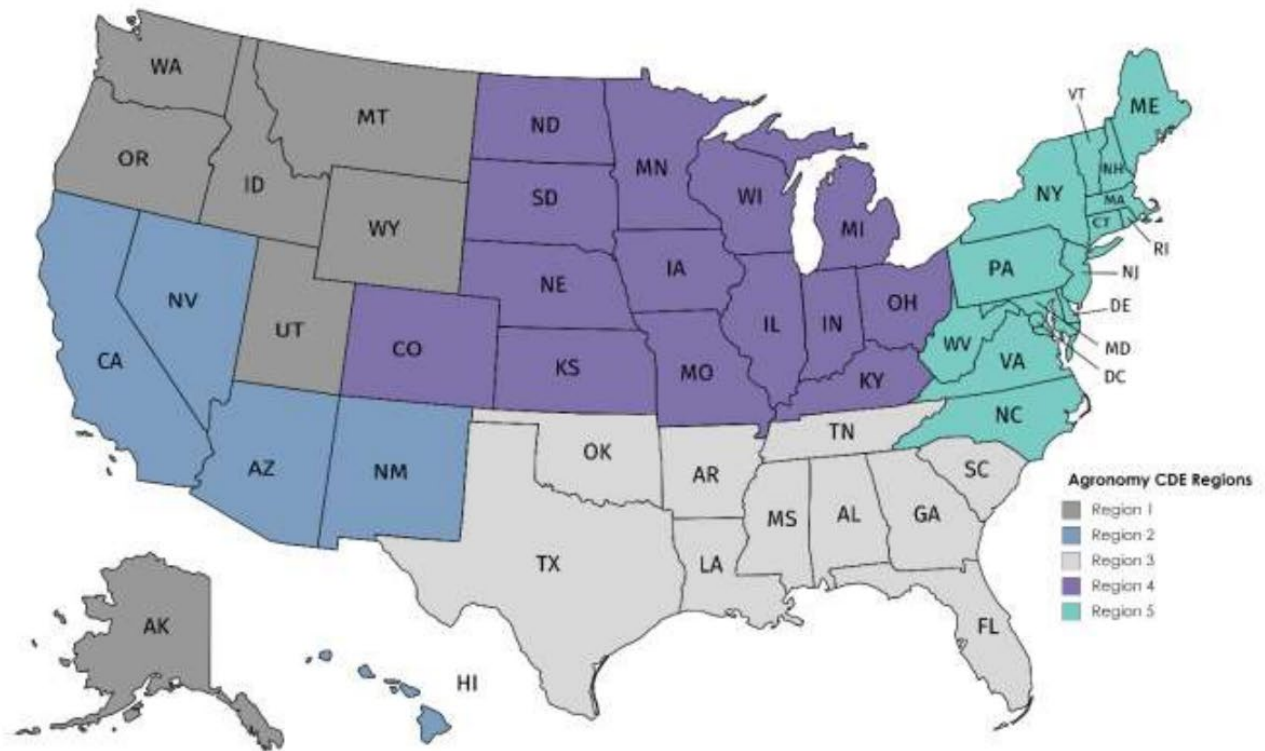
WRITTEN EXAM:

The best resource for the written exam is old exams available from the National FFA Organization. Exam questions will be based off the last three years of national exams, excluding the most recent year. There is no single resource for the exam.

- <http://ohioline.osu.edu/factsheet/HYG-1133>
- <http://www.extension.iastate.edu/Publications/SR48.html>
- <https://store.extension.iastate.edu> In Search Box, type "Soybean."
- <https://gaps.cornell.edu>

WASHINGTON FFA - Note to Contest Coordinator: If plant ID samples do not exhibit species specific identifiable characteristics- include additional mounted samples etc. to make clear or exclude sample from contest.

National FFA Agronomy CDE Regional Areas



Crops List

Region 1

2022
 alfalfa
 barley
 canola
 chickpea/Garbanzo
 corn
 dry beans
 fescue
 hops
 lentil
 peas
 potatoes
 ryegrass
 safflower
 sugar beet
 timothy
 wheat

Region 2

2023
 alfalfa
 bermudagrass
 brassica
 cantaloupe
 corn
 cotton
 lettuce
 onion
 pepper
 rice
 safflower
 sorghum
 spinach
 strawberry
 Sudan grass
 timothy
 tomato
 wheat

Region 3

2024
 bermudagrass
 brassica
 cantaloupe
 corn
 cotton
 cucumber
 fescue
 peanuts
 rice
 sod
 soybean
 sugarcane
 tomato
 wheat
 watermelon

Region 4

2025
 alfalfa
 barley
 canola
 corn
 dry beans
 flax
 hops
 peas
 rye
 safflower
 sorghum
 soybean
 sugar beet
 sunflower
 tomato
 wheat

Region 5

2021/2026
 alfalfa
 clover
 cantaloupe
 corn
 cranberry
 tall fescue
 dry beans
 orchardgrass
 peas
 potatoes
 sorghum
 squash
 strawberry
 timothy
 tobacco
 tomato
 wheat
 watermelon

Weeds List

Conforming with the Weed Science Society of America's standardized name list.

ID #	Weed Name	Form	Latin Name
100	amaranth, Palmer	plant only	<i>Amaranthus palmeri</i>
101	barnyardgrass	plant or seed	<i>Echinochloa crus-galli</i>
102	bindweed, field	plant or seed	<i>Convolvulus arvensis</i>
103	brome, downy	plant only	<i>Bromus tectorum</i>
104	buckwheat, wild	plant or seed	<i>Fallopia convolvulus</i>
105	carrot, wild	plant or seed	<i>Daucus carota</i>
106	cheat	plant or seed	<i>Bromus secalinus</i>
107	chickweed, common	plant or seed	<i>Stellaria media</i>
108	cocklebur, common	plant or seed as bur	<i>Xanthium strumarium</i>
109	crabgrass, large	plant or seed	<i>Digitaria sanguinalis</i>
110	crownvetch, trailing	plant or seed	<i>Securigera varia</i>
111	dandelion	plant or seed	<i>Taraxacum officinale</i>
112	dock, curly	plant or seed	<i>Rumex crispus</i>
113	dodder	plant or seed	<i>Cuscuta</i> spp.
114	foxtail, giant	plant or seed	<i>Setaria faberi</i>
115	foxtail, green	plant or seed	<i>Setaria viridis</i>
116	foxtail, yellow	plant or seed	<i>Setaria pumila</i>
117	goatgrass, jointed	plant or seed	<i>Aegilops cylindrica</i>
118	groundcherry	plant or seed	<i>Physalis</i> spp.
119	groundsel, cressleaf	plant or seed	<i>Packera glabella</i>
120	horsenettle	plant or seed	<i>Solanum carolinense</i>
121	horseweed (maretail)	plant only	<i>Conyza canadensis</i>
122	jimsonweed	plant or seed	<i>Datura stramonium</i>
123	johnsongrass	plant or seed	<i>Sorghum halpense</i>
124	knapweed, Russian	plant only	<i>Rhaponticum repens</i>
125	knotweed, prostrate	plant or seed	<i>Polygonum aviculare</i>
126	kochia	plant or seed	<i>Bassia scoparia</i>
127	kudzu	plant only	<i>Pueraria montana var lobata</i>
128	lambsquarters, common	plant or seed	<i>Chenopodium album</i>
129	lettuce, prickly	plant or seed	<i>Lactuca serriola</i>
130	mallow, common	plant or seed	<i>Malva neglecta</i>
131	milkweed, common	plant or seed	<i>Asclepias syriaca</i>
132	morningglory	plant or seed	<i>Ipomoea</i> spp.
133	mustard, wild	plant or seed	<i>Sinapis arvensis</i>
134	nightshade, black	plant or seed	<i>Solanum nigrum</i>
135	nightshade, silverleaf	plant or seed	<i>Solanum elaeagnifolium Cav.</i>
136	nutsedge	plant or seed as nutlet	<i>Cyperus</i> spp.
137	oat, wild	plant or seed	<i>Avena fatua</i>
138	onion/garlic, wild	plant or seed	<i>Allium</i> spp.
139	pennycress, field	plant or seed	<i>Thlaspi arvense</i>
140	pigweed, redroot	plant or seed	<i>Amaranthus retroflexus</i>
141	plantain, broadleaf	plant or seed	<i>Plantago major</i>
142	plantain, buckhorn	plant or seed	<i>Plantago lanceolata</i>
143	puncturevine	plant or seed	<i>Tribulus terrestris</i>
144	purslane, common	plant or seed	<i>Portulaca oleracea</i>
145	quackgrass	plant or seed	<i>Elymus repens</i>
146	ragweed, common	plant or seed	<i>Ambrosia artemisiifolia</i>
147	ragweed, giant	plant or seed	<i>Ambrosia trifida</i>
148	Russian-thistle	plant or seed	<i>Salsola tragus</i>
149	sandbur, field	plant or seed	<i>Cenchrus spinifex Cav.</i>
150	shepherd's-purse	plant or seed	<i>Capsella bursa-pastoris</i>
151	sicklepod	plant or seed	<i>Senna obtusifolia</i>
152	smartweed	plant or seed	<i>Persicaria</i> spp.
153	sowthistle	plant or seed	<i>Sonchus</i> spp.
154	spurge, leafy	plant or seed	<i>Euphorbia esula</i>
155	spurge, prostrate	plant only	<i>Euphorbia prostrata</i>
156	sunflower, common	plant or seed	<i>Helianthus annuus</i>
157	tansymustard	plant or seed	<i>Descurainia pinnata</i>
158	thistle, bull	plant or seed	<i>Cirsium vulgare</i>
159	thistle, Canada	plant or seed	<i>Cirsium arvense</i>
160	velvetleaf	plant or seed	<i>Abutilon theophrasti</i>
161	waterhemph	plant only	<i>Amaranthus tuberculatus</i>

Crops List

Conforming with the United States Department of Agriculture plant database.

ID #	Crop Name	Form	Scientific Name
200	alfalfa	plant or seed	<i>Medicago sativa</i>
201	barley	plant or seed	<i>Hordeum vulgare</i>
203	bermudagrass	plant or seed	<i>Cynodon dactylon</i>
204	black bean	seed only	<i>Phaseolus vulgaris</i>
205	broccoli	plant only	<i>Brassica oleracea</i> var. <i>italica</i>
260	buckwheat	plant or seed	<i>Fagopyrum sagittatum</i>
206	cabbage	plant only	<i>Brassica oleracea</i>
207	canola	plant or seed	<i>Brassica napus</i>
208	cantaloupe	plant or seed	<i>Cucumis melo</i> var. <i>cantalupensis</i>
209	carrot	root provided	<i>Daucus carota</i> L. var. <i>sativus</i>
210	cauliflower	plant only	<i>Brassica oleracea</i> var. <i>botrytis</i>
237	cereal rye	plant or seed	<i>Secale cereale</i>
211	chickpea	seed only	<i>Cicer arietinum</i>
212	chili pepper	plant or seed	<i>Capsicum annum</i>
213	corn	plant only	<i>Zea mays</i>
214	cotton	plant or seed	<i>Gossypium hirsutum</i>
215	cranberry	plant only	<i>Vaccinium macrocarpon</i>
216	cucumber	plant or seed	<i>Cucumis sativus</i>
217	dent corn	seed only	<i>Zea mays</i> var. <i>indentata</i>
202	dry bean	plant only	<i>Phaseolus vulgaris</i>
218	durum wheat	seed only	<i>Triticum durum</i>
219	flax	plant or seed	<i>Linum usitatissimum</i>
220	hops	plant only	<i>Humulus lupulus</i>
221	Kentucky bluegrass	plant or seed	<i>Poa pratensis</i>
222	lentil	plant or seed	<i>Lens culinaris</i>
223	lettuce	plant or seed	<i>Lactuca sativa</i>
224	lima bean	seed only	<i>Phaseolus lunatus</i>
225	oat	plant or seed	<i>Avena sativa</i>
226	onion	plant or seed	<i>Allium cepa</i>
227	orchardgrass	plant or seed	<i>Dactylis glomerata</i>
229	pea	plant or seed	<i>Pisum Sativum</i>
228	peanut	plant or seed	<i>Arachis hypogaea</i>
230	pinto bean	seed only	<i>Phaseolus vulgaris</i>
231	popcorn	seed only	<i>Zea mays</i> var. <i>everta</i>
232	potato	plant only	<i>Solanum tuberosum</i>
233	red bean	seed only	<i>Phaseolus vulgaris</i>
234	red clover	plant or seed	<i>Trifolium pratense</i>
235	red wheat	seed only	<i>Triticum aestivum</i>
236	rice	plant or seed	<i>Oryza sativa</i>
238	safflower	plant or seed	<i>Carthamus tinctorius</i>
239	sorghum	plant or seed	<i>Sorghum bicolor</i>
240	soybean	plant or seed	<i>Glycine max</i>
241	spinach	plant or seed	<i>Spinacia oleracea</i>
242	squash	plant or seed	<i>Curcubita pepo</i>
243	strawberry	plant only	<i>Fragaria L.</i>
244	Sudangrass	seed only	<i>Sorghum bicolor</i>
245	sugar beet	plant or seed	<i>Beta vulgaris</i>
246	sugarcane	plant only	<i>Saccharum L.</i>
247	sunflower	plant or seed	<i>Helianthus annuus</i>
248	sweet corn	seed only	<i>Zea mays</i> var. <i>saccharata</i>
249	sweet potato	plant only	<i>Ipomoea batatas</i>
250	sweetclover	plant or seed	<i>Melilotus albus</i>
251	tall fescue	plant or seed	<i>Festuca arundinacea</i>
252	timothy	plant or seed	<i>Phleum pratense</i>
253	tobacco	plant or seed	<i>Nicotiana tabacum</i>
254	tomato	plant or seed	<i>Lycopersicon esculentum</i>
255	watermelon	plant or seed	<i>Citrullus lanatus</i>
256	wheat	plant only	<i>Triticum aestivum</i>
257	white bean	seed only	<i>Phaseolus vulgaris</i>
258	white clover	plant or seed	<i>Trifolium repens</i>
259	white wheat	seed only	<i>Triticum aestivum</i>

National Insect List Official Guide

ID #	Common Name	Latin Names, Order: Family for Possible Specimens	Mouth parts	Economic Impact
11.	Alfalfa weevil, adult or larva	<i>Hyperica postica</i> , Coleoptera:Curculionidae	C	V
12.	Aphid	various species, Homoptera:Aphididae	PS	R
13.	Arm yworm adult	<i>Pseudaletia unipuncta</i> , Lepidoptera:Noctuidae (true arm yworm)	S	IS
		<i>Spodoptera frugiperda</i> , Lepidoptera:Noctuidae (fall arm yworm)		
		<i>Spodoptera exigua</i> , Lepidoptera:Noctuidae (beet arm yworm)		
14.	Arm yworm larva	<i>Pseudaletia unipuncta</i> , Lepidoptera:Noctuidae (true arm yworm)	C	V
		<i>Spodoptera frugiperda</i> , Lepidoptera:Noctuidae (fall arm yworm)		
		<i>Spodoptera exigua</i> , Lepidoptera:Noctuidae (beet arm yworm)		
15.	Bean leaf beetle	<i>Cerotoma trifurcata</i> , Coleoptera:Chrysomelidae	C	F and V
16.	Blister beetle	<i>Epicauta pennsylvanica</i> , Coleoptera:Meloidae (black blister beetle)	C	V
		<i>Epicauta pestifera</i> , Coleoptera:Meloidae (marginated blister beetle)		
		<i>Epicauta vittata</i> , Coleoptera:Meloidae (striped blister beetle)		
17.	Boll weevil	<i>Anthonomus grandis grandis</i> , Coleoptera:Curculionidae	C	F
18.	Chinch bug	<i>Blissus leucoptera</i> , Hemiptera:Lygaeidae	PS	R
19.	Colorado potato beetle, adult, or larva	<i>Leptinotarsa decemlineata</i> , Coleoptera:Chrysomelidae	C	V
20.	Corn Earworm adult	<i>Helicoverpa zea</i> , Lepidoptera:Noctuidae	S	IS
21.	Corn Earworm larva	<i>Helicoverpa zea</i> , Lepidoptera:Noctuidae	C	F and V
22.	Corn rootworm adult	<i>Dia brotica barberi</i> , Coleoptera:Chrysomelidae (northern)	C	F and V
		<i>Dia brotica undecimpunctata howardii</i> , Coleoptera:Chrysomelidae (southern)		
		<i>Dia brotica vergifera</i> , Coleoptera:Chrysomelidae (western)		
23.	Corn rootworm larva	<i>Dia brotica sp.</i> , Coleoptera:Chrysomelidae	C	V
24.	Cutworm adult	<i>Agrotis epsilon</i> , Lepidoptera:Noctuidae (black cutworm)	S	IS
		<i>Peridroma saucia</i> , Lepidoptera:Noctuidae (variegated cutworm)		
		<i>Striacosta albicosta</i> , Lepidoptera:Noctuidae (western bean cutworm)		
25.	Cutworm larva	<i>Agrotis epsilon</i> , Lepidoptera:Noctuidae (black cutworm)	C	V
		<i>Peridroma saucia</i> , Lepidoptera:Noctuidae (variegated cutworm)		
		<i>Striacosta albicosta</i> , Lepidoptera:Noctuidae (western bean cutworm)		
26.	European corn borer adult	<i>Ostrinia nubilalis</i> , Lepidoptera:Pyralidae	S	IS
27.	European corn borer larva	<i>Ostrinia nubilalis</i> , Lepidoptera:Pyralidae	C	F and V

ID #	Common Name	Latin Names, Order: Family for Possible Specimens	Mouth parts	Economic Impact
28.	Field cricket	<i>Gryllus sp.</i> , Orthoptera :Gryllidae	C	F
29.	Flea beetle	<i>Chaetocnema pulicaria</i> , Coleoptera :Chrysomelidae (corn flea beetle)	C	V
		<i>Systema blanda</i> , Coleoptera :Chrysomelidae (palestriped flea beetle)		
		<i>Phyllotreta striolata</i> , Coleoptera :Chrysomelidae (striped flea beetle)		
30.	Grain weevil	<i>Sitophilus granarius</i> , Coleoptera :Curculionidae (granary weevil)	C	F
		<i>Sitophilus oryzae</i> , Coleoptera :Curculionidae (rice weevil)		
31.	Grasshopper	various species, Orthoptera :Acrididae	C	V
32.	Green lacewing	<i>Chrysopa sp.</i> , Neuroptera :Chrysopidae	C	B
33.	Honeybee	<i>Apis mellifera</i> , Hymenoptera :Apidae	CL	B
34.	Imported cabbageworm	<i>Pieris rapae</i> , Lepidoptera :Pieridae	C	F and V
35.	Japanese beetle	<i>Popilla japonica</i> , Coleoptera :Scarabaeidae	C	F and V
36.	Lady beetle adult or larva	various species, Coleoptera :Coccinellidae	C	B
37.	Leafhopper	<i>Empoasca fabae</i> , Homoptera :Cicadellidae (potato leafhopper)	PS	R
38.	Mexican bean beetle, adult or larva	<i>Epilachna varivestis</i> , Coleoptera :Coccinellidae	C	F and V
39.	Saltmarsh caterpillar	<i>Estigmene acrea</i> , Lepidoptera :Arctiidae	C	V
40.	Spider mite	various species, Trombidiformes :Tetranychidae	RS	V
41.	Spittlebug	various species, Hemiptera :Cercopidae	PS	R
42.	Squash bug	<i>Anasa tristis</i> , Hemiptera :Coreidae	PS	R
43.	Stink bug	various species, Hemiptera :Pentatomidae	PS	R
44.	Striped cucumber beetle	<i>Acalymma vittatum</i> , Coleoptera :Chrysomelidae	C	F and V
45.	Tarnished plant bug	<i>Lygus lineolaris</i> , Hemiptera :Miridae	PS	R
46.	Thrips	various species, Thysanoptera :Thripidae	RS	V
47.	Tomato or tobacco hornworm	<i>Manduca sp.</i> , Lepidoptera :Sphingidae	C	F and V
48.	whitefly	various species, Homoptera :Aleyrodidae	RS	V
49.	wire worm	various species, Coleoptera :Elateridae	C	V

Mouth parts key:

CL (chewing-lapping)
PS (piercing sucking)
RS (Rasping Sucking)
S (siphoning)

Economic impact key:

Must indicate all options in response

B (Beneficial)
F (fruit/flower destruction)
IS (indicator species)
R (removal of plant fluids)
V (vegetative part destruction)

Machinery List

11. Air seeder (tool and air cart together)
12. Anemometer
13. Anhydrous applicator with tank
14. Articulated tractor (wheeled only type tractor)
15. Auger platform head for combine
16. Backpack sprayer
17. Bale wagon (kick or flat)
18. Bed shaper
19. Belt pickup head for combine
20. Broadcast fertilizer spreader
21. Chemigation unit for irrigation
22. Combine (may be displayed with harvesting head attached)
23. Conveyor/Elevator/Auger
24. Corn head for combine
25. Cotton picker
26. Cotton stripper
27. Rolling Harrow
28. Disk
29. Disk chisel
30. Draper head for combine or swather
31. Drawn planter
32. Dry fertilizer density scale
33. Field cultivator
34. Field shovel
35. Forage harvester (may be displayed with harvesting head attached)
36. GPS receiver
37. Grain bin/leg
38. Grain drill (includes no-till)
39. Grain dryer
40. Swather (drawn or self-propelled)
41. Gravity wagon
42. Hand hoe
43. Hay merger
44. Hay mower/conditioner (disk or reel/drawn, 3pt, or self-propelled)
45. Hay rake (reel or wheel)
46. Hearing protection
47. Hitch pin
48. Hydraulic cylinder/hose
49. In-line ripper
50. Integral planter

51. Irrigation — lateral
52. Irrigation — traveling gun
53. Irrigation center-pivot
54. Liquid manure tank/applicator (includes draglines)
55. Manure sampling kit
56. Manure spreader
57. Module builder
58. Moldboard plow
59. Nurse tank trailer
60. Pea harvester
61. Peanut digger
62. Plastic layer
63. Potato harvester
64. PPE (all equipment)
65. Pressure gauge
66. PTO shaft
67. Rotary hoe
68. Round baler
69. Row crop cultivator
70. Row crop tractor (wheeled only tractor)
71. Row independent forage harvester head (kemper head)
72. Skid steer
73. Soil penetrometer
74. Soil probe (for collection of soil sample)
75. Soil sample bag
76. Soil thermometer
77. Specialty tractor (orchard, narrow, low profile, high clearance)
78. Sprayer
79. Sprayer nozzle
80. Square baler (large or small)
81. Strip tiller
82. Sugar beet harvester
83. Sweep net
84. Tensiometer
85. Tissue sample bag
86. Tracked tractor (any configuration of tracks on a tractor)
87. Vegetable transplanter
88. Virtual terminal/monitor/controller
89. V-Ripper
90. Wheel loader

Agronomic Disorders Practicum Scorecard

Name		Member Number		
Chapter	State	Team Number		
	Member Answer	Possible Points	Member Score	
1.	Casual Category:	3		Causal Category Biological (B) Cultural (C) Environmental (E) Agents Bacteria (B) Chemical (Ch) Compaction (Co) Drought (D) Frost damage (Fr) Fungus (Fn) Hail (Ha) Heat (Ht) Insect (I) Lightning (L) Mechanical (Me) Moisture (Mo) Nematodes (Ne) Nutritional (Nu) Pollution (P) Sun scald (S) Virus (V) Wind damage(W) Parts of Plant Displayed Reproductive parts (R) Vegetative parts (Ve) Vascular bundles (Va) More than one (M)
	Agent:	4		
	Part of Plant Displayed:	3		
2.	Casual Category:	3		
	Agent:	4		
	Part of Plant Displayed:	3		
3.	Casual Category:	3		
	Agent:	4		
	Part of Plant Displayed:	3		
4.	Casual Category:	3		
	Agent:	4		
	Part of Plant Displayed:	3		
5.	Casual Category:	3		
	Agent:	4		
	Part of Plant Displayed:	3		
6.	Casual Category:	3		
	Agent:	4		
	Part of Plant Displayed:	3		
7.	Casual Category:	3		
	Agent:	4		
	Part of Plant Displayed:	3		
8.	Casual Category:	3		
	Agent:	4		
	Part of Plant Displayed:	3		
9.	Casual Category:	3		
	Agent:	4		
	Part of Plant Displayed:	3		
10.	Casual Category:	3		
	Agent:	4		
	Part of Plant Displayed:	3		
TOTAL POINTS EARNED OUT OF 100 POSSIBLE				

Agronomy Form #708-4

Incorrect Marks: ✓ X ● ●
Correct Mark: ●

Team Name

This sheet is for demonstration and practice only. You must use a real scan sheet for actual competition.

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

Last Name	First Name
A	A
B	B
C	C
D	D
E	E
F	F
G	G
H	H
I	I
J	J
K	K
L	L
M	M
N	N
O	O
P	P
Q	Q
R	R
S	S
T	T
U	U
V	V
W	W
X	X
Y	Y
Z	Z

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

Assessments					
1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E
6	A	B	C	D	E
7	A	B	C	D	E
8	A	B	C	D	E
9	A	B	C	D	E
10	A	B	C	D	E

Solutions					
11	A	B	C	D	E
12	A	B	C	D	E
13	A	B	C	D	E
14	A	B	C	D	E
15	A	B	C	D	E
16	A	B	C	D	E
17	A	B	C	D	E
18	A	B	C	D	E
19	A	B	C	D	E
20	A	B	C	D	E

General Knowledge Exam	
1	A B C D E
2	A B C D E
3	A B C D E
4	A B C D E
5	A B C D E
6	A B C D E
7	A B C D E
8	A B C D E
9	A B C D E
10	A B C D E
11	A B C D E
12	A B C D E
13	A B C D E
14	A B C D E
15	A B C D E
16	A B C D E
17	A B C D E
18	A B C D E
19	A B C D E
20	A B C D E
21	A B C D E
22	A B C D E
23	A B C D E
24	A B C D E
25	A B C D E
26	A B C D E
27	A B C D E
28	A B C D E
29	A B C D E
30	A B C D E
31	A B C D E
32	A B C D E
33	A B C D E
34	A B C D E
35	A B C D E
36	A B C D E
37	A B C D E
38	A B C D E
39	A B C D E
40	A B C D E
41	A B C D E
42	A B C D E
43	A B C D E
44	A B C D E
45	A B C D E
46	A B C D E
47	A B C D E
48	A B C D E
49	A B C D E
50	A B C D E

Judging Classes		1	2
1	1234		
2	1243		
3	1324		
4	1342		
5	1423		
6	1432		
7	2134		
8	2143		
9	2314		
10	2341		
11	2413		
12	2431		
13	3124		
14	3142		
15	3214		
16	3241		
17	3412		
18	3421		
19	4123		
20	4132		
21	4213		
22	4231		
23	4312		
24	4321		

Sample #:	Identification		Economic Impact	Life Cycle	Mouth Parts
	Tens Digit	Ones Digit			
3	1 2 ● 4	7 0 1 2 3 4 5 6 ● 8 9	None or predatory Fruit/Flower destruction Vegetative part destruction Removal of plant fluids	Complete Incomplete None	Chewing Chewing-lapping Rasping-sucking Piercing-sucking Sponging Siphoning
1	1 2 3 4	0 1 2 3 4 5 6 7 8 9	NP F V R	C I N	C CL RS PS Sp Si
2	1 2 3 4	0 1 2 3 4 5 6 7 8 9	NP F V R	C I N	C CL RS PS Sp Si
3	1 2 3 4	0 1 2 3 4 5 6 7 8 9	NP F V R	C I N	C CL RS PS Sp Si
4	1 2 3 4	0 1 2 3 4 5 6 7 8 9	NP F V R	C I N	C CL RS PS Sp Si
5	1 2 3 4	0 1 2 3 4 5 6 7 8 9	NP F V R	C I N	C CL RS PS Sp Si
6	1 2 3 4	0 1 2 3 4 5 6 7 8 9	NP F V R	C I N	C CL RS PS Sp Si
7	1 2 3 4	0 1 2 3 4 5 6 7 8 9	NP F V R	C I N	C CL RS PS Sp Si
8	1 2 3 4	0 1 2 3 4 5 6 7 8 9	NP F V R	C I N	C CL RS PS Sp Si
9	1 2 3 4	0 1 2 3 4 5 6 7 8 9	NP F V R	C I N	C CL RS PS Sp Si
10	1 2 3 4	0 1 2 3 4 5 6 7 8 9	NP F V R	C I N	C CL RS PS Sp Si

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

Sample #:	Causal Category	Agents																Parts of Plant Displayed						
		Biological	Cultural	Environmental	Bacteria	Chemical	Compaction	Drought	Frost damage	Fungus	Hail	Heat	Insect	Lightning	Mechanical	Moisture	Nematodes	Nutritional	Pollution	Sun scald	Virus	Wind damage	Reproductive	Vegetative
1	(B C E)	(B Ch Co D Fr Fn Ha Ht I L Me Mo Ne Nu P S V W)	(R Ve Va M)																					
2	(B C E)	(B Ch Co D Fr Fn Ha Ht I L Me Mo Ne Nu P S V W)	(R Ve Va M)																					
3	(B C E)	(B Ch Co D Fr Fn Ha Ht I L Me Mo Ne Nu P S V W)	(R Ve Va M)																					
4	(B C E)	(B Ch Co D Fr Fn Ha Ht I L Me Mo Ne Nu P S V W)	(R Ve Va M)																					
5	(B C E)	(B Ch Co D Fr Fn Ha Ht I L Me Mo Ne Nu P S V W)	(R Ve Va M)																					
6	(B C E)	(B Ch Co D Fr Fn Ha Ht I L Me Mo Ne Nu P S V W)	(R Ve Va M)																					
7	(B C E)	(B Ch Co D Fr Fn Ha Ht I L Me Mo Ne Nu P S V W)	(R Ve Va M)																					
8	(B C E)	(B Ch Co D Fr Fn Ha Ht I L Me Mo Ne Nu P S V W)	(R Ve Va M)																					
9	(B C E)	(B Ch Co D Fr Fn Ha Ht I L Me Mo Ne Nu P S V W)	(R Ve Va M)																					
10	(B C E)	(B Ch Co D Fr Fn Ha Ht I L Me Mo Ne Nu P S V W)	(R Ve Va M)																					

Weed/Crop - Plant and Seed Identification

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9

26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9

Equipment/Machinery Identification

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

Soils & Nutrient Management

1	A	B	C	D	E	26	A	B	C	D	E
2	A	B	C	D	E	27	A	B	C	D	E
3	A	B	C	D	E	28	A	B	C	D	E
4	A	B	C	D	E	29	A	B	C	D	E
5	A	B	C	D	E	30	A	B	C	D	E
6	A	B	C	D	E	31	A	B	C	D	E
7	A	B	C	D	E	32	A	B	C	D	E
8	A	B	C	D	E	33	A	B	C	D	E
9	A	B	C	D	E	34	A	B	C	D	E
10	A	B	C	D	E	35	A	B	C	D	E
11	A	B	C	D	E	36	A	B	C	D	E
12	A	B	C	D	E	37	A	B	C	D	E
13	A	B	C	D	E	38	A	B	C	D	E
14	A	B	C	D	E	39	A	B	C	D	E
15	A	B	C	D	E	40	A	B	C	D	E
16	A	B	C	D	E	41	A	B	C	D	E
17	A	B	C	D	E	42	A	B	C	D	E
18	A	B	C	D	E	43	A	B	C	D	E
19	A	B	C	D	E	44	A	B	C	D	E
20	A	B	C	D	E	45	A	B	C	D	E
21	A	B	C	D	E	46	A	B	C	D	E
22	A	B	C	D	E	47	A	B	C	D	E
23	A	B	C	D	E	48	A	B	C	D	E
24	A	B	C	D	E	49	A	B	C	D	E
25	A	B	C	D	E	50	A	B	C	D	E

Agronomy Team Activity Scorecard

Chapter Name: _____

Team Number: _____

	Category	Excellent	Good	Fair	Possible	Score
I.	<i>Teamwork Evaluation</i>	50-40	39-30	29-0	50	
	<ul style="list-style-type: none"> • Leadership roles perceived • Participation by all members • Demonstrated listening skills • Demonstrated use of time 					
II.	<i>Proposal</i>	50-40	39-30	29-0	50	
	Analysis of Information <ul style="list-style-type: none"> • Clearly Identify the problem • Data analyzed and utilized • Possible solutions analyzed • Each solution discussed • Short-term and long-term approach discussed 					
III.	<i>Oral Presentation</i>	150-135	134-90	89-0	150	
	<ul style="list-style-type: none"> • Follows management plan • Delivery professional and well thought out • Presentation clear and effective 					
IV.	<i>Questions</i>	150-135	134-90	89-0	150	
	<ul style="list-style-type: none"> • Each member of the team responds to at least one question • Answers follow management plan • Confidence shown 					
Grand Total					400	

Judge's Name: _____

Signature/Date: _____

Performance Measurement Levels	Event Activities Addressing Measurements	Related Academic Standards
ABS.01.01. Performance Indicator: Apply micro- and macroeconomic principles to plan and manage inputs and outputs in an AFNR business.		CCSS.ELA-Literacy.L.9-10.6 CCSS.ELA-LITERACY.L.11-12.6 CCSS.ELA-LITERACY.RST.9-10.4 CCSS.ELA-LITERACY.RST.11-12.4 CCSS.MATH.CONTENT.HSS.ID.C.7 CCSS.MATH.CONTENT.HSS.IC.B.6 Financial Investing: Benchmarks: Grade 12, Statement 9
ABS.01.01.01.c. Create strategies to maximize the efficiency of AFNR business inputs and outputs using microeconomic principles.	Team activity	
ABS.01.01.02.c. Analyze the impact of the current macroeconomic environment on decisions related to AFNR businesses.	Team activity	
ABS.01.03. Performance Indicator: Devise and apply management skills to organize and run an AFNR business in an efficient, legal and ethical manner.		CCSS.ELA-LITERACY.SL.9-10.6 CCSS.ELA-LITERACY.SL.11-12.6 CCSS.ELA-LITERACY.L.9-10.6 CCSS.ELA-LITERACY.L.11-12.6 CCSS.ELA-LITERACY.RST.9-10.4 CCSS.ELA-LITERACY.RST.11-12.4
ABS.01.03.01.c. Devise strategies to improve the operation of AFNR businesses using management skills.	Team activity	
ABS.01.03.02.c. Devise management or operational strategies to address and adhere to local, state, federal, international and industry regulations.	Team activity	
ABS.03. Performance Element: Manage cash budgets, credit budgets and credit for an AFNR business using generally accepted accounting principles.		
ABS.03.01.01.c. Develop cash budgets for AFNR businesses.	Team activity	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

Performance Measurement Levels	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.04.01.01.c. Demonstrate the application of entrepreneurial skills to conceptualize an AFNR business (e.g., idea generation, opportunity analysis, risk assessment, etc.).	Team activity	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.04.01.03.c. Prepare business plans for an AFNR business.	Team activity	
ABS.04.02. Performance Indicator: Develop production and operational plans for an AFNR business.		
ABS.04.02.01.b. Compare and contrast the strengths and weaknesses of operational plans from different AFNR businesses to determine best practices.	Team activity	AFNR Career Cluster – Agribusiness Systems Pathway, Statement 3 CCSS.ELA-LITERACY.ELA-W.9-10.2 CCSS.ELA-LITERACY.W.11-12.2 CCSS.ELA-LITERACY.L.9-10.6 CCSS.ELA-LITERACY.L.11-12.6 CCSS.ELA-LITERACY.RST.9-10.4 CCSS.ELA-LITERACY.RST.11-12.4
ABS.05.01. Performance Indicator: Analyze the role of markets, trade, competition and price in relation to an AFNR business sales and marketing plans.		
ABS.05.01.01.c. Evaluate and predict future trends for a specific AFNR product as related to markets, trade and price (e.g., corn, oil, wheat, etc.).	Grain grading	AFNR Career Cluster, Statement 7 AFNR Career Cluster – Agribusiness Systems Pathway, Statement 1 Financial Investing: Benchmarks: Grade 12, Statement 13
ABS.05.02. Performance Indicator: Assess and apply sales principles and skills to accomplish AFNR business objectives.		
ABS.05.02.01.c. Analyze the sales process of AFNR businesses and create methods to suggest improvements.	Team activity	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

Performance Measurement Levels	Event Activities Addressing Measurements	Related Academic Standards
		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.c. Deconstruct and analyze current AFNR marketing plans to determine the effectiveness of implementation of marketing principles and alternative marketing strategies.	Team activity	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
CS.01.01. Performance Indicator: Examine issues and trends that impact AFNR systems on local, state, national and global levels.		
CS.01.01.01.c. Evaluate and explain AFNR issues and their impacts to audiences with limited AFNR knowledge.	Issues interview	
CS.01.01.02.c. Evaluate emerging trends and the opportunities they may create within the AFNR systems.	Issues interview	
CS.01.02. Performance Indicator: Examine technologies and analyze their impact on AFNR systems.		
CS.01.02.01.c. Solve problems in AFNR workplaces or scenarios using technology	Grain grading	

Performance Measurement Levels	Event Activities Addressing Measurements	Related Academic Standards
CS.01.02.02.c. Evaluate the importance of technology use and how it impacts AFNR systems.	Grain grading	
CS.01.03. Performance Indicator: Identify public policies and their impact on AFNR systems.		
CS.7.02.01.c. Evaluate a public policy within AFNR systems and defend or challenge it.	Issues interview	
CS.7.02.02.c. Create a plan for implementing a new public policy that will positively impact AFNR systems.	Issues interview	
CS.02.01. Performance Indicator: Research geographic and economic data related to AFNR systems.		
CS.02.01.01.c. Evaluate geographic data and select necessary data sets to solve problems within AFNR systems.	Soils	
CS.02.02. Performance Indicator: Examine the components of the AFNR systems and their impact on the local, state, national and global society and economy		
CS.02.02.01.c. Devise a strategy for explaining components of AFNR systems to audiences with limited knowledge.	Issues interview	
CS.02.02.02.c. Evaluate how society traditions, customs or policies have resulted from practices with AFNR systems.	Issues interview	
CS.02.02.03.c. Evaluate how positive or negative changes in the local, state, national or global economy impacts AFNR systems.	Issues interview	
CS.03.01. Performance Indicator: Identify required regulations to maintain and improve safety, health and environmental management systems.		
CS.03.01.01.c. Evaluate how AFNR organizations/businesses promote improved health, safety and environmental management.	Exam	

Performance Measurement Levels	Event Activities Addressing Measurements	Related Academic Standards
CS.03.01.02.c. Construct and implement methods to evaluate compliance with required safety, health and environmental management regulations.	Exam	
CS.03.04. Performance Indicator: Use appropriate protective equipment and demonstrate safe and proper use of AFNR tools and equipment.		
C3.06.04.01.c. Design plans to ensure the use of appropriate protective equipment when using various AFNR tools and equipment.	Exam	
C3.06.04.02.c. Evaluate and select appropriate tools and equipment to complete AFNR tasks.	Exam; machinery identification	
CS.04.01. Performance Indicator: Identify and implement practices to steward natural resources in different AFNR systems.		
CS.04.01.02.c. Evaluate sustainability policies and plans and prepare summary of potential improvements for AFNR businesses or organizations.	Issues interview	
CS.04.02. Performance Indicator: Assess the natural resource related trends, technologies and policies that impact AFNR systems.		
CS.04.02.01.c. Defend or challenge natural resources trends and technologies based upon an assessment of their impact on AFNR systems.	Issues interview	
CS.06.01. Performance Indicator: Explain foundational cycles and systems of AFNR.		
CS.06.01.02.c. Evaluate AFNR systems and predict how the systems may change or adapt in the future of food, fiber and fuel production based on current trends and data.	Issues interview	
CS.06.02. Performance Indicator: Explain the connection and relationships between different AFNR systems on a national and global level.		
CS.06.02.01.c. Evaluate how AFNR systems impact each other on a national and global level.	Issues interview	

Performance Measurement Levels	Event Activities Addressing Measurements	Related Academic Standards
CS.06.02.02.c. Evaluate how changes in one AFNR system can benefit cost components of other systems on a national and global level.	Issues interview	
FPP.01.02. Performance Indicator: Apply food safety and sanitation procedures in the handling and processing of food products to ensure food quality.		
FPP.01.02.01.c. Identify sources of contamination in food products and/or processing facilities and develop ways to eliminate contamination.	Grain grading; Exam	
FPP.01.03. Performance Indicator: Apply food safety procedures when storing food products to ensure food quality.		
FPP.01.03.01.a. Identify and summarize purposes of food storage procedures (e.g., first in/first out, temperature regulation, monitoring, etc.).	Grain grading	
FPP.03.01. Performance Indicator: Implement selection, evaluation and inspection techniques to ensure safe and quality food products.		
FPP.03.01.01.c. Outline procedures to assign quality and yield grades to food products according to industry standards.	Grain grading	AFNR Career Cluster – Food Products and Processing Systems Pathway, Statement 1 AFNR Career Cluster – Food Products and Processing Systems Pathway, Statement 2 Buying Goods and Services, Benchmarks: Grade 12, Statement 7
FPP.03.01.02.b. Assemble procedures to perform quality-control inspections of raw food products for processing.	Grain grading	
FPP.03.02. Performance Indicator: Design and apply techniques of food processing, preservation, packaging and presentation for distribution and consumption of food products.		
FPP.03.02.01.a. Identify and explain English and metric measurements used in the food products and processing industry.	Grain grading	AFNR Career Cluster – Food Products and Processing Systems Pathway, Statement 3
FPP.04.01. Performance Indicator: Examine the scope of the food industry by evaluating local and global policies, trends and customs for food production.		
FPP.04.01.01.c. Articulate and defend a personal point of view on policies and legislation that affect the food products and	Issues interview	HS-ETS1-3 .

Performance Measurement Levels	Event Activities Addressing Measurements	Related Academic Standards
processing system in the U.S. or around the world.		
NRS.01.01. Performance Indicator: Apply methods of classification to examine natural resource availability and ecosystem function in a particular region.		
NRS.01.01.01.c. Devise strategies for the preservation of natural resources based on their classification.	Soils; team activity	AFNR Career Cluster, Statement 1 AFNR Career Cluster, Statement 2 AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3 STEM Career Cluster, Statement 1 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.2 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.9-10.9 CCSS.ELA-LITERACY.WHST.11-12.9
NRS.01.01.02.c. Conduct analyses of ecosystems and document the interactions of living species and non-living resources.	Exam	AFNR Career Cluster, Statement 1 AFNR Career Cluster, Statement 2 AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3 STEM Career Cluster, Statement 1 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.2 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.9-10.9 CCSS.ELA-LITERACY.WHST.11-12.9
NRS.01.02. Performance Indicator: Classify different types of natural resources in order to enable protection, conservation, enhancement and management in a particular geographical region.		
NRS.01.02.05.c. Evaluate the non-living resources present in an area to determine the best practices for improving, enhancing and protecting an ecosystem.	Soils	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

Performance Measurement Levels	Event Activities Addressing Measurements	Related Academic Standards
		HS-ESS3-2
NRS.01.05. Performance Indicator: Apply ecological concepts and principles to terrestrial natural resource systems.		
NRS.01.05.04.c. Devise a soil management plan to minimize erosion and maximize biodiversity, plant productivity, and the formation of topsoil.	Soils	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.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.	Grain grading	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
PS.01.01. Performance Indicator: Determine the influence of environmental factors on plant growth.		
PS.01.01.01.c. Analyze plant responses to varied light color, intensity and duration and recommend modifications to light for desired plant growth.	Exam	
PS.01.01.03.c. Analyze plant responses to water conditions and recommend modifications to water for desired plant growth.	Commodity evaluation	
PS.01.02. Performance Indicator: Prepare and manage growing media for use in plant systems.		

Performance Measurement Levels	Event Activities Addressing Measurements	Related Academic Standards
PS.01.02.01.c. Formulate and prepare growing media for specific plants or crops.	Exam	
PS.01.02.02.c. Determine the hydraulic conductivity for soil and how the results influence irrigation practices.	Exam; team activity; pest management; soils	
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.).	Team activity; Exam; pest management	CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3
PS.01.03.01.c. Monitor plants for signs of nutrient deficiencies and prepare a scouting report to correct elements negatively affecting plant growth in a field or greenhouse.	Pest management	CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3
PS.01.03.02.c. Adjust the pH of growing media for specific plants or crops.	Exam; team activity	CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3
PS.01.03.03.c. Prescribe fertilizer applications based on the results of a laboratory analysis of soil and plant tissue samples.	Exam; team activity	CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3
PS.01.03.05.c. Devise a plan for soil management for a selected production method.	Exam; team activity; soils	CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3
PS.01.03.06.c. Devise a plan to meet plant nutrient needs based on environmental factors present.	Team activity	CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3
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.c. Apply the knowledge of cell differentiation and the functions of the major types of cells to plant systems.	Exam	HS-LS1-4
PS.02.02.02.c. Correlate the active and passive transport of minerals into and through the root system to plant nutrition.	Exam	HS-LS1-5

Performance Measurement Levels	Event Activities Addressing Measurements	Related Academic Standards
PS.02.02.03.c. Evaluate the function of the xylem, phloem and cambium tissues and the impact on plant systems.	Exam	HS-LS1-5
PS.02.02.04.c. Devise a plan for plant management practices that takes into account leaf structure and functions.	Team activity	HS-LS1-5
PS.02.02.05.c. Evaluate flower structures and analyze the impact of plant structure on plant breeding, production and use.	Exam	HS-LS1-4 HS-LS1-5
PS.02.02.06.c. Evaluate the impact of different seed and fruit structures to plant culture and use.	Exam	HS-LS1-4 HS-LS1-5
PS.01.03. Performance Indicator: Apply knowledge of plant physiology and energy conversion to plant systems.		
PS.02.03.01.c. Evaluate the impact of photosynthesis and the factors that affect it on plant management, culture and production problems.	Exam	HS-LS1-5
PS.02.03.02.c. Evaluate the impact of plant respiration on plant growth, crop management and post-harvest handling decisions.	Exam	HS-LS1-5
PS.02.03.05.c. Devise plans for plant management that applies knowledge of transpiration, translocation and assimilation on plant growth.	Exam	HS-LS1-4 HS-LS1-5
PS.03. Performance Element: Propagate, culture and harvest plants and plant products based on current industry standards.		
PS.03.01.01.c. Select and defend the use of pollination methods and practices used to maximize crop pollination.	Exam	
PS.03.01.02.a. Demonstrate sowing techniques for providing favorable conditions to meet the factors of seed germination.	Machinery identification	

Performance Measurement Levels	Event Activities Addressing Measurements	Related Academic Standards
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	
PS.03.01.04.a. Define micropropagation, discuss advantages associated with the practice and summarize the main stages of the process.	Exam	
PS.03.01.05.b. Compare and contrast the potential risks and advantages associated with genetically modified plants.	Issues activity	
PS.03.02. Performance Indicator: Develop and implement a management plan for plant production.		
PS.03.02.01.b. Inspect propagation material for evidence of pests or disease.	Pest management	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.b. Prepare soil and growing media for planting with the addition of amendments.	Soils	
PS.03.02.03.a. Determine seeding rate need for specified plant population or desired quantity of finished plants.	Team activity	
PS.03.02.04.a. Observe and record environmental conditions during the germination, growth and development of a crop.	Exam	
PS.03.02.04.c. Prepare and implement a plant production schedule based on predicted environmental conditions and desired market target (e.g., having plants ready to market on a specific day such as Mother’s Day, organic production, low maintenance landscape plants, etc.).	Team activity	

Performance Measurement Levels	Event Activities Addressing Measurements	Related Academic Standards
PS.03.02.05.b. Demonstrate proper techniques to control and manage plant growth through mechanical, cultural or chemical means.	Exam	
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.	Pest management and identification	
PS.03.03.01.b. Identify and analyze major local weeds, insect pests and infectious and noninfectious plant diseases.	Pest management and identification	
PS.03.03.01.c. Devise solutions for plant pests, diseases and disorders.	Team activity and pest management	
PS.03.03.02.b. Predict pest and disease problems based on environmental conditions and life cycles.	Pest management; exam and team activity	
PS.03.03.03.c. Employ pest management strategies to manage pest populations, assess the effectiveness of the plan and adjust the plan as needed.	Team activity; pest management and exam	
PS.03.03.04.b. Examine and apply procedures for the safe handling, use and storage of pesticides including personal protective equipment and reentry interval.	Exam	
PS.03.04. Performance Indicator: Apply principles and practices of sustainable agriculture to plant production.		
PS.03.04.01.c. Research, prepare and defend plans for a plant systems enterprise that aligns with USDA sustainable practices criteria.	Issues interview	AFNR Career Cluster, Statement 2 STEM Career Cluster, Statement 1 STEM Career Cluster, Statement 4 HS-ESS3-2
PS.03.04.02.c. Select and defend the use of nationally/internationally grown or locally/regionally grown for a production operation system.	Issues interview	AFNR Career Cluster, Statement 2 STEM Career Cluster, Statement 1 STEM Career Cluster, Statement 4 HS-ESS3-2
PS.03.05. Performance Indicator: Harvest, handle and store crops according to current industry standards.		

Performance Measurement Levels	Event Activities Addressing Measurements	Related Academic Standards
PS.03.05.01.c. Analyze the processes used by mechanical harvesting equipment.	Machinery identification	CCSS.ELA-Literacy.RST.9-10.3 CCSS.ELA-Literacy.RST.9-10.4 CCSS.ELA-Literacy.WHST.9-10.2a-
PS.03.05.02.b. Evaluate crop yield and loss data and make recommendations to reduce crop loss.	Team activity	CCSS.ELA-Literacy.RST.9-10.3 CCSS.ELA-Literacy.RST.9-10.4 CCSS.ELA-Literacy.WHST.9-10.2a-
PS.03.05.03.c. Research laws and apply regulations to ensure the production of plants and plant products that are safe for distribution and use.	Pest management and 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.b. Demonstrate techniques for grading, handling and packaging plants and plant products for distribution.	Grain grading	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.c. Evaluate techniques for grading, handling and packaging plants and plant products.	Grain grading and commodity evaluation	CCSS.ELA-Literacy.RST.9-10.3 CCSS.ELA-Literacy.RST.9-10.4 CCSS.ELA-Literacy.WHST.9-10.2a-
CRP.01.01. Performance Indicator: Model personal responsibility in the workplace and community.		
CRP.01.01.02.c. Model personal responsibility in workplace and community situations.	Team activity	
CRP.01.02 Performance Indicator: Evaluate and consider the near-term and long-term impacts of personal and professional decisions on employers and community before taking action.		
CRP.01.02.01.c. Make and defend personal decisions after analyzing their near- and long-term impacts on self and others.	Team activity	
CRP.01.02.02.c. Make and defend professional decisions after evaluating their near- and long-term impacts on employers and community.	Team activity	
CRP.01.02.02.c. Make and defend professional decisions after evaluating their near- and long-term impacts on employers and community.	Team activity	
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.		

Performance Measurement Levels	Event Activities Addressing Measurements	Related Academic Standards
CRP.02.01.02.c. Apply academic knowledge and skills to solve problems in the community and reflect upon results achieved.	Issues interview	
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.c. Apply technical concepts to solve problems in the workplace and reflect upon the results achieved.	Team activity; commodity evaluation and pest management	
CRP.04.01. Performance Indicator: Speak using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.		
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.	Issues interview; team activity	
CRP.04.02. Performance Indicator: Produce clear, reasoned and coherent written communication in formal and informal settings.		
CRP.04.02.02.c. Compose clear and coherent written documents (e.g., agendas, audio-visuals, drafts, forms, etc.) for formal and informal settings.	Team activity	
CRP.04.03. Performance Indicator: Model active listening strategies when interacting with others in formal and informal settings.		
CRP.04.03.01.b. Apply active listening strategies (e.g., be attentive, observe non-verbal cues, ask clarifying questions, etc.).	Team activity; issues interview	
CRP.07.01. Performance Indicator: Select and implement reliable research processes and methods to generate data for decision-making in the workplace and community.		
CRP.07.01.01.b. Analyze how different research methods are used to generate data in a variety of situations.	Team activity and soils	
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.07.02.01.c. Propose valid and reliable data sources to use when considering the adoption of new technologies, practices and ideas.	Issues interview	

Performance Measurement Levels	Event Activities Addressing Measurements	Related Academic Standards
CRP.07.02.02.c. Create and defend proposals for new technologies, practices and ideas using valid and reliable data sources.	Issues interview	
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	
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.08.02.02.c. Evaluate and select solutions with greatest potential for success to solve workplace and community problems.	Team activity and pest management	
CRP.11.01. Performance Indicator: Research, select and use new technologies, tools and applications to maximize productivity in the workplace and community.		
CRP.11.01.01.b. Analyze advantages and disadvantages of new technologies, tools and applications to maximize productivity in the workplace and community.	Team activity and issues interview	
CRP.11.01.01.c. Construct effective communications to explain the features, benefits and risks of new technologies, tools and applications in the workplace and community	Issues interview	
CRP.11.01.02.b. Select, apply and use new technologies, tools and applications in workplace and community situations to maximize productivity.	Team activity, exam, and pest management	

