Agronomy

Purpose

The purpose of the National 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
- 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

- 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.
- Participants will be assigned to group leaders who will escort them to various event-staging sites. Each participant is to stay with his or her assigned group leader throughout the event or until told to change leaders by the event superintendent.

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.

Event Format

Materials students must provide include the following:

- Clean, free-of-notes clipboard.
- Two sharpened No. 2 pencils.
- Non-programmable calculator.
    - The calculators used during the event are to be battery operated, non-programmable, and 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 during the event.
- One laptop computer per team.
    - Laptops must have USB port, be flash-drive compatible and have Microsoft Word and Excel. The laptop will be used for budgets and final reporting for the team activity only. Laptops must be fully-charged and be capable of continuous activity for 90 minutes.

Individual Practicums

General Knowledge Examination (50 points)

Fifty objective multiple-choice questions will be given to each participant. These 50 questions will be pulled from a test bank updated annually on tnffa.org. These categories are Pest Management, Nutrient Management, Crop Management and Soil and Water Quality.

Identification (200 points)

Students will identify 50 weed and/or crop plants and/or seeds. Plants may be presented in any stage of growth following emergence. Specimens can be pictures, presses, live samples, etc. 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.
    - Interpret graphs and tables of data based on soil parameters.

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. Refer to the Insect Identification Practicum Scorecard for additional details.

Event 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	50	200
Identification	200	800
Soils	100	400
Pest management	200	800
TOTAL POINTS POSSIBLE	550	2,200

Tiebreakers

If ties occur for awards, the following components will be used to determine the placings:

Team

1. Team identification.
2. Total pest management.

Individual

1. Plant and seed identification
2. Soils.
3. Written exam.

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. Please note that universities frequently update or change their web servers which can invalidate the listed website.

Plant Identification

- Flashcards 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.HTML
- 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/
- Agriculture/Pests-and-Diseases/Weeds/Virginia-Tech-Weed-Identification-Guide. https://weedid.cals.vt.edu/
- 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/

Disease/Disorder

- http://plantdiseasehandbook.tamu.edu

Insects

- http://www2.ca.uky.edu/agcomm/pubs/ENT/ENT68/ENT68.pdf

Soils

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

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	*Amaranthus palmeri*
101	barnyardgrass	plant or seed	*Echinochloa crus-galli*
102	bindweed, field	plant or seed	*Convolvulus arvensis*
103	brome, downy	plant only	*Bromus tectorum*
104	buckwheat, wild	plant or seed	*Fallopia convolvulus*
105	carrot, wild	plant or seed	*Daucus carota*
106	cheat	plant or seed	*Bromus secalinus*
107	chickweed, common	plant or seed	*Stellaria media*
108	cocklebur, common	plant or seed as bur	*Xanthium strumarium*
109	crabgrass, large	plant or seed	*Digitaria sanguinalis*
110	crownvetch, trailing	plant or seed	*Securigera varia*
111	dandelion	plant or seed	*Taraxacum officinale*
112	dock, curly	plant or seed	*Rumex crispus*
113	dodder	plant or seed	*Cuscuta* spp.
114	foxtail, giant	plant or seed	*Setaria faberi*
115	foxtail, green	plant or seed	*Setaria viridis*
116	foxtail, yellow	plant or seed	*Setaria pumila*
117	goatgrass, jointed	plant or seed	Aegilops cylindrica
118	groundcherry	plant or seed	*Physalis spp.*
119	groundsel, cressleaf	plant or seed	*Packera glabella*
120	horsenettle	plant or seed	*Solanum carolinense*
121	horseweed (marestail)	plant only	*Conyza canadensis*
122	jimsonweed	plant or seed	*Datura stramonium*
123	johnsongrass	plant or seed	*Sorghum halpense*
124	knapweed, Russian	plant only	*Rhaponticum repens*
125	knotweed, prostrate	plant or seed	*Polygonum aviculare*
126	kochia	plant or seed	*Bassia scoparia*
127	kudzu	plant only	*Pueraria montana var lobata*
128	lambsquarters, common	plant or seed	*Chenopodium album*
129	lettuce, prickly	plant or seed	*Lactuca serriola*
130	mallow, common	plant or seed	*Malva neglecta*
131	milkweed, common	plant or seed	*Asclepias syriaca*
132	morningglory	plant or seed	*Ipomoea* spp.
133	mustard, wild	plant or seed	*Sinapis arvensis*
134	nightshade, black	plant or seed	*Solanum nigrum*
135	nightshade, silverleaf	plant or seed	*Solanum elaeagnifolium Cav.*
136	nutsedge	plant or seed as nutlet	*Cyperus* spp.
137	oat, wild	plant or seed	*Avena fatua*
138	onion/garlic, wild	plant or seed	*Allium* spp.
139	pennycress, field	plant or seed	*Thlaspi arvense*

Weeds List

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

ID #	Weed Name	Form	Latin Name
140	pigweed, redroot	plant or seed	*Amaranthus retroflexus*
141	plantain, broadleaf	plant or seed	*Plantago major*
142	plantain, buckhorn	plant or seed	*Plantago lanceolata*
143	puncturevine	plant or seed	*Tribulus terrestris*
144	purslane, common	plant or seed	*Portulaca oleracea*
145	quackgrass	plant or seed	*Elymus repens*
146	ragweed, common	plant or seed	*Ambrosia artemisiifolia*
147	ragweed, giant	plant or seed	*Ambrosia trifida*
148	Russian-thistle	plant or seed	*Salsola tragus*
149	sandbur, field	plant or seed	*Cenchrus spinifex Cav.*
150	shepherd's-purse	plant or seed	*Capsella bursa-pastoris*
151	sicklepod	plant or seed	*Senna obtusifolia*
152	smartweed	plant or seed	*Persicaria* spp.
153	sowthistle	plant or seed	*Sonchus* spp.
154	spurge, leafy	plant or seed	*Euphorbia esula*
155	spurge, prostrate	plant only	*Euphorbia prostrata*
156	sunflower, common	plant or seed	*Helianthus annuus*
157	tansymustard	plant or seed	*Descurainia pinnata*
158	thistle, bull	plant or seed	*Cirsium vulgare*
159	thistle, Canada	plant or seed	*Cirsium arvense*
160	velvetleaf	plant or seed	*Abutilon theophrasti*
161	waterhemp	plant only	*Amaranthus tuberculatus*

Crops List

Conforming with the United States Department of Agriculture plant database.

ID #	Crop Name	Form	Scientific Name
200	alfalfa	plant or seed	*Medicago sativa*
201	barley	plant or seed	*Hordeum vulgare*
203	bermudagrass	plant or seed	*Cynodon dactylon*
204	black bean	seed only	*Phaseolus vulgaris*
205	broccoli	plant only	*Brassica oleracea* var. italica
260	buckwheat	plant or seed	*Fagopyrum sagittatum*
206	cabbage	plant only	*Brassica oleracea*
207	canola	plant or seed	*Brassica napus*
208	cantaloupe	plant or seed	*Cucumis melo* var. cantalupensis
209	carrot	root provided	*Daucus carota L. var. sativus*
210	cauliflower	plant only	*Brassica oleracea* var. botrytis
237	cereal rye	plant or seed	*Secale cereale*
211	chickpea	seed only	*Cicer arietinum*
212	chili pepper	plant or seed	*Capsicum annuum*
213	corn	plant only	*Zea mays*
214	cotton	plant or seed	*Gossypium hirsutum*
215	cranberry	plant only	*Vaccinium macrocarpon*
216	cucumber	plant or seed	*Cucumis sativus*
217	dent corn	seed only	*Zea mays var. indentata*
202	dry bean	plant only	*Phaseolus vulgaris*
218	durum wheat	seed only	*Triticum durum*
219	flax	plant or seed	*Linum usitatissimum*
220	hops	plant only	*Humulus lupulus*
221	Kentucky bluegrass	plant or seed	*Poa pratensis*
222	lentil	plant or seed	*Lens culinaris*
223	lettuce	plant or seed	*Lactuca sativa*
224	lima bean	seed only	*Phaseolus lunatus*
225	oat	plant or seed	*Avena sativa*
226	onion	plant or seed	*Allium cepa*
227	orchardgrass	plant or seed	*Dactylis glomerata*
229	pea	plant or seed	*Pisum Sativum*
228	peanut	plant or seed	*Arachis hypogaea*
230	pinto bean	seed only	*Phaseolus vulgaris*
231	popcorn	seed only	*Zea mays var. everta*
232	potato	plant only	*Solanum tuberosum*
233	red bean	seed only	*Phaseolus vulgaris*
234	red clover	plant or seed	*Trifolium pratense*
235	red wheat	seed only	*Triticum avestivum*
236	rice	plant or seed	*Oryza sativa*
238	safflower	plant or seed	*Carthamus tinctorius*

Crops List

Conforming with the United States Department of Agriculture plant database.

ID #	Crop Name	Form	Scientific Name
239	sorghum	plant or seed	*Sorghum bicolor*
240	soybean	plant or seed	*Glycine max*
241	spinach	plant or seed	*Spinacia oleracea*
242	squash	plant or seed	*Curcurbita pepo*
243	strawberry	plant only	*Fragaria L.*
244	Sudangrass	seed only	*Sorghum bicolor*
245	sugar beet	plant or seed	*Beta vulgaris*
246	sugarcane	plant only	*Saccharum L.*
247	sunflower	plant or seed	*Helianthus annuus*
248	sweet corn	seed only	*Zea mays var. saccharata*
249	sweet potato	plant only	*Ipomoea batatas*
250	sweetclover	plant or seed	*Melilotus albus*
251	tall fescue	plant or seed	*Festuca arundinacea*
252	timothy	plant or seed	*Phleum pratense*
253	tobacco	plant or seed	*Nicotiana tabacum*
254	tomato	plant or seed	*Lycopersicon esculentum*
255	watermelon	plant or seed	*Citrullus lanatus*
256	wheat	plant only	*Triticum aestivum*
257	white bean	seed only	*Phaseolus vulgaris*
258	white clover	plant or seed	*Trifolium repens*
259	white wheat	seed only	*Triticum aestivum*

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	*Hyperica postica, Coleoptera:Curculionidae*	C	V
12.	Aphid	*various species, Homoptera:Aphididae*	PS	R
13.	Armyworm adult	*Pseudaletia unipuncta, Lepidoptera:Noctuidae* (true armyworm)	S	IS
		Spodoptera frugiperda, Lepidoptera:Noctuidae (fall armyworm)		
		Spodoptera exigua, Lepidoptera:Noctuidae (beet armyworm)		
14.	Armyworm larva	*Pseudaletia unipuncta, Lepidoptera:Noctuidae* (true armyworm)	C	V
		Spodoptera frugiperda, Lepidoptera:Noctuidae (fall armyworm)		
		Spodoptera exigua, Lepidoptera:Noctuidae (beet armyworm)		
15.	Bean leaf beetle	*Cerotoma trifurcata, Coleoptera:Chrysomelidae*	C	F and V
16.	Blister beetle	*Epicauta pennsylvanica, Coleoptera:Meloidae* (black blister beetle)	C	V
		Epicauta pestifera, Coleoptera:Meloidae (margined blister beetle)		
		Epicauta vittata, Coleoptera:Meloidae (striped blister beetle)		
17.	Boll weevil	*Anthonomis grandis grandis, Coleoptera:Curculionidae*	C	F
18.	Chinch bug	*Blissus leucoptera, Hemiptera:Lygaeidae*	PS	R
19.	Colorado potato beetle, adult, or larva	*Leptinotarsa decemlineata, Coleoptera:Chrysomelidae*	C	V
20.	Corn Earworm adult	*Helicoverpa zea, Lepidoptera:Noctuidae*	S	IS
21.	Corn Earworm larva	*Helicoverpa zea, Lepidoptera:Noctuidae*	C	F and V
22.	Corn rootworm adult	*Diabrotica barberi, Coleoptera:Chrysomelidae* (northern)	C	F and V
		Diabrotica undecimpunctata howardii, Coleoptera:Chrysomelidae (southern)		
		Diabrotica vergifera, Coleoptera:Chrysomelidae (western)		
23.	Corn rootworm larva	*Diabrotica sp., Coleoptera:Chrysomelidae*	C	V
24.	Cutworm adult	*Agrotis epsilon, Lepidoptera:Noctuidae* (black cutworm)	S	IS
		Peridroma saucia, Lepidoptera:Noctuidae (variegated cutworm)		
		Striacosta albicosta, Lepidoptera:Noctuidae (western bean cutworm)		
25.	Cutworm larva	*Agrotis epsilon, Lepidoptera:Noctuidae* (black cutworm)	C	V
		Peridroma saucia, Lepidoptera:Noctuidae (variegated cutworm)		
		Striacosta albicosta, Lepidoptera:Noctuidae (western bean cutworm)		
26.	European corn borer adult	*Ostrinia nubilalis, Lepidoptera:Pyralidae*	S	IS
27.	European corn borer larva	*Ostrinia nubilalis, Lepidoptera:Pyralidae*	C	F and V

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

Mouth parts key:

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

Economic impact key:
Must indicate all options in response

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

Agronomic Disorders Practicum Scorecard

Name **Member Number**

Chapter **State** **Team Number**

		Member Answer	Possible Points	Member Score
1.	Casual Category:		3	
	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	

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 Damaged
Reproductive parts (R)
Vegetative parts (Ve)
Vascular bundles (Va)
More than one (M)

Insect Identification Rubric

Name **Member Number**

Chapter **State** **Team Number**

		Member Answer	Possible Points	Member Score
1.	Identification:		4	
	Economic Impact:		3	
	Mouth Part:		3	
2.	Identification:		4	
	Economic Impact:		3	
	Mouth Part:		3	
3.	Identification:		4	
	Economic Impact:		3	
	Mouth Part:		3	
4.	Identification:		4	
	Economic Impact:		3	
	Mouth Part:		3	
5.	Identification:		4	
	Economic Impact:		3	
	Mouth Part:		3	
6.	Identification:		4	
	Economic Impact:		3	
	Mouth Part:		3	
7.	Identification:		4	
	Economic Impact:		3	
	Mouth Part:		3	
8.	Identification:		4	
	Economic Impact		3	
	Mouth Part:		3	
9.	Identification:		4	
	Economic Impact:		3	
	Mouth Part:		3	
10.	Identification:		4	
	Economic Impact:		3	
	Mouth Part:		3	
	TOTAL POINTS EARNED OUT OF 100 POSSIBLE			

Possible Answers
Identification

11. Alfalfa weevil, adult or larva
12. Aphid
13. Armyworm adult
14. Armyworm larva
15. Bean leaf beetle
16. Blister beetle
17. Boll weevil
18. Chinch bug
19. Colorado potato beetle, adult or larva
20. Corn Earworm adult
21. Corn Earworm larva
22. Corn rootworm adult
23. Corn rootworm larva
24. Cutworm adult
25. Cutworm larva
26. European corn borer adult
27. European corn borer larva
28. Field cricket
29. Flea beetle
30. Grain weevil
31. Grasshopper
32. Green lacewing
33. Honeybee
34. Imported cabbageworm
35. Japanese beetle
36. Lady beetle adult or larva
37. Leafhopper
38. Mexican bean beetle, adult or larva
39. Saltmarsh caterpillar
40. Spider mite
41. Spittlebug
42. Squash bug
43. Stink bug
44. Striped cucumber beetle
45. Tarnished plant bug
46. Thrips
47. Tomato or tobacco hornworm
48. Whitefly
49. Wireworm

Economic Impact
Must include all options in response
B (Beneficial)
F (fruit/flower destruction)
IS (indicator species)
R (removal of plant fluids)
V (vegetative part destruction)

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