

AGRONOMY
Drs. Kevin Donnelly - Coordinator
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2nd Floor Foyer, Throckmorton Hall
Monday, April 30, 2011
Registration: 12:30 – 1:00 p.m.
Contest: 1:15 – 4:15 p.m.

Complete rules and references information is available under the Events icon on the Agronomy Department homepage (www.agronomy.ksu.edu).

The three high individual scores out of four contestants will be used for the Team total score. The contest will consist of four major sections as follows:

Group A. Identification

Classes 1, 2, 3. Identification of weeds and crops, plants, or seeds. 100 total samples.

Group B. Grain Grading and Seed Analysis

Classes 4, 5, 6. Three Grain Grading samples chosen from the following crops: wheat, grain sorghum, corn, and soybean.

Classes 7, 8, 9. Three Seed Analysis samples chosen from the following crops: wheat, alfalfa, oat, grain sorghum, soybean, barley and rye.

Group C. Agronomic Quiz and Calculations

Class 10. A general knowledge quiz consisting of 30 multiple choice questions, plus six calculation problems related to fertilizer application, seeding rates, pure live seed, plant population, harvest losses, yield estimation, sprayer calibration, etc. General knowledge questions will cover basic principles of crop production and soil management, including plant growth processes and crop development, tillage and seedbed preparation, variety selection, seeding, essential nutrients and fertilization practices, pest development and pest control (weeds, insects, diseases), water management, harvest factors and crop quality effects, and residue management. Focus will be on major grain crops (wheat, corn, sorghum, soybean, sunflowers, canola) and forages (alfalfa, fescue, brome grass, native range) grown in Kansas. Some questions will require comparison of different crops for production data (KS, USA, world), uses and products, grain or forage quality, growth habit or adaptation, critical growth stages for stress, etc. Questions may include topics related best management practices for preserving environmental quality, water quality, soil conservation, and sustainability.

Group D. Soils, Fertilizers, Crops, and Herbicides Practicum

Class 11. A general knowledge practicum consisting of 37 stations where students will perform simple analyses or answer questions such as: determine soil texture by feel; interpret herbicide, seed, and/or fertilizer labels; answer questions from publications such as a *Soil Survey Report*, *Weed Control Handbook*, *Crop Planting Guide*, or *Crop Variety Trial* reports; write or interpret legal land descriptions; interpret soil test recommendation reports; identify insects, diseases, and common agronomic equipment; identify weeds in the vegetative stage; identify common fertilizer carriers, ag lime, inoculum, etc.; name common nutrient deficiencies shown on crop plants (N, P, K, S, Fe); identify the crop from which various feed ingredients are made (ie. soybean meal, wheat bran, alfalfa pellets); identify growth stages of major crop plants (corn, wheat, sorghum, soybean); name common plant structures (on seeds, seedlings, roots, stems, leaves, or flowers).

Kansas State Career Development Events in Agriculture

Agronomy Event 2012

Rules and Regulations

General Information

Event Coordinator

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Updates for 2012

1. The event will again consist of four parts, 40 minutes each, scored as follows.

<u>Part</u>	<u>Class</u>			
1	1 - 3	Crop and Weed Identification	100 samples	300 points
2	4 - 6	Grain Grading	3 samples	150 points
	7 - 9	Seed Analysis	3 samples	150 points
3	10	Agronomic Quiz/Calculations	30 questions/6 calculations	150 points
4	11	Practicum	50 stations	<u>150 points</u>
		TOTAL		<u>900 points</u>

2. Identification

There are no changes to the identification list for 2012.

3. Grain Grading

There are no changes to grading standards for 2012. Sweet corn and pop corn found in corn are foreign material and may be shown on the cards. Sorghum grading standards are the most recent changes, and the new standards have been used since the 2009 contest. In case you have not updated your grain grading books, a copy of the new standards table is again provided on the following page, or you can go to www.gipsa.usda.gov, find the Federal Grain Inspection Section, and click on the "Official US Standards" icon. Please be sure to correct your key for any cards that you are using for practice to match the new table.

4. Seed Analysis

There are no changes in rules for seed analysis for 2012.

5. Agronomic Quiz/Calculations

The Agronomic Quiz will again be a general knowledge quiz, primarily focused on crop science but also including questions about weed science and soils, including soil conservation and water quality. A more detailed description of possible quiz topics has been provided in the introduction under Group C, and in the detailed rules (Class 10). Old quizzes from past contests are available for study on the Agronomy Department web site (www.ksu.edu/agronomy). CDE materials can be found under the "events" icon.

6. Practicum

The number of stations will be increased from 30 to 37 for 2012. Each station will now be worth 4 points. Contestants have been completing this section with plenty of time remaining. This will allow showing more diseases, insects and vegetative weeds. The list of diseases, insects, and vegetative stage weeds will be the same for 2012. A more detailed description of possible practicum stations has been provided in the introduction under Group D, and in the detailed rules (Class 11).

Sorghum Grades and Grade Requirements

§ 810.1404 - Grades and grade requirements for sorghum.

Grading factors	Grades U.S. Nos. ^{1/}			
	1	2	3	4
Minimum pound limits of				
Test weight per bushel:	57.0	55.0	53.0	51.0
Maximum percent limits of				
Damaged kernels:				
Heat (part of total)	0.2	0.5	1.0	3.0
Total	2.0	5.0	10.0	15.0
Broken kernels and foreign material:				
Foreign material (part of total)	1.0	2.0	3.0	4.0
Total	3.0	6.0	8.0	10.0
Maximum count limits of				
Other material:				
Animal filth	9	9	9	9
Castor beans	1	1	1	1
Crotalaria seeds	2	2	2	2
Glass	1	1	1	1
Stones ^{2/}	7	7	7	7
Unknown foreign substance	3	3	3	3
Cocklebur	7	7	7	7
Total ^{3/}	10	10	10	10
<p>U.S. Sample grade is sorghum that:</p> <p>(a) Does not meet the requirements for U.S. Nos. 1, 2, 3, or 4; or</p> <p>(b) Has a musty, sour or commercially objectionable foreign odor (except smut odor); or</p> <p>(c) Is badly weathered, heating or distinctly low quality.</p>				
<p>^{1/} Sorghum which is distinctly discolored shall not grade higher than U.S. No. 3.</p> <p>^{2/} Aggregate weight of stones must also exceed 0.2 percent of the sample weight.</p> <p>^{3/} Includes any combination of animal filth, castor beans, crotalaria seeds, glass, stones, unknown foreign substances or cocklebur.</p>				

Resource Materials

Materials available from the Kansas State University Department of Agronomy. **(Except for References, order from the event coordinator.)**

Item	Description	Price
Plant samples	Crop and weed plants each mounted on 8 ½ x 11 inch cardstock.	\$1.00 each
Seed samples	Coin envelope containing approximately one tablespoon of seed.	\$0.75 each
Identification manual	Identification tips and descriptions of 99 weeds and 63 crops.	\$6.00 each
Weed Plant and Seed CD-ROM	Slides of 79 weed plants and 58 weed seeds are included on a CD as PowerPoint and PDF files along with Identification Tips in a Text file.	No Charge Limit--one copy per school
Grain grading sets	Set of grain grading samples from previous events.	\$8.00 per set
Seed analysis sets	Set of seed analysis samples from previous events.	\$8.00 per set
U.S. grain standards	Booklet containing the current official U.S. standards for corn, sorghum, soybean, and wheat.	\$1.50 each
References for Agronomic Quiz	Available at County Extension Offices, the KSU Extension Agronomy website, or KSU Department of Communications Publications Office, Umberger Hall, Room 24, Manhattan, KS 66506.	

Other sources of materials

Interchange of materials among teachers, especially between those in the eastern and western parts of the state, is encouraged.

Weed plants and weed seeds you collect may be identified by your County Weed Supervisor or you may send them to us for identification. If you bring the materials to the campus when you are in Manhattan, we will discuss identifying characteristics with you.

General Rules

1. Teams will consist of four members, with the highest three scores counted for the team total. Teams must participate in their appropriate District Agronomy Event to be eligible to participate in the State Agronomy Event.
2. No communication with anyone other than officials will be permitted while the event is underway.
3. No cell phones or PDA's will be allowed in the contest rooms. If anyone has a cell phone ring during the contest, he/she will be disqualified and removed from the contest.
4. Magnifying glass, forceps, writing boards, pencil or pen, electronic calculator, handbooks for grain grading, and a seed analysis picking board not to exceed 9" x 12" in size, are the only items that may be taken into the event by the contestant. Calculators must be battery operated, non-programmable, and silent.
5. Information concerning ID of seeds, pictures of grains for classing, etc. may not be included in Grain Grading books used by contestants. Grain Grading books may be used only when contestants are doing the Grain Grading portion of the contest (not during seed analysis or identification).
6. Infraction of rules will be followed by penalties varying from taking off points to dismissal from the event.
7. Legible writing is important and the judges will consider this factor in determining scores. Correct spelling is encouraged; spelling may be used to break tie scores.
8. Tie scores for individual rankings and awards will be broken by: first, seed analysis total points; second, grain grading total points; and third, identification total points.

Tie scores for team rankings and awards will be broken similarly using team total points in first, seed analysis; second, grain grading; and third, identification.

Identification – Classes 1 - 3

Identification of grain crop plants and/or seeds; forage crop plants or seeds; weed plants or seeds.

1. 100 samples will be identified in 3 classes of 33 or 34 samples each. 39 minutes are allowed to identify the 100 samples (13 minutes for each class). 300 points total, 3 points per sample.
2. All event samples will come from the official identification list.
3. Samples will be identified on a multiple choice basis and recorded on an answer sheet (see examples below).
4. Correct spelling and proper names will be used for the choices listed; however, all choices will not necessarily be from the official identification list.

Examples:

- _____ 1. (A) barley (B) rye (C) hard red winter wheat (D) hard white wheat (E) durum wheat
_____ 2. (A) sumac sorgo (B) shattercane (C) sudangrass (D) orange sorgo (E) johnsongrass
_____ 3. (A) downy brome (B) Japanese brome (C) quackgrass (D) cheat (E) jointed goatgrass

**Kansas State Career Development Events in Agriculture
Agronomy Event
Official Identification List**

- | | |
|------------------------|--|
| (p) plant or head only | (b) both plant and seed together |
| (s) seed only | No designation - plant or head or seed |

Grain Crops (GC)

- | | | | |
|----------------------------|-----|---------------------|-----|
| GC-1 Karl 92 wheat | (b) | GC-11 barley | |
| GC-2 Jagger wheat | (b) | GC-12 rye | |
| GC-3 Trego wheat | (b) | GC-13 rice | (s) |
| GC-4 hard red winter wheat | (s) | GC-14 sunflower | (s) |
| GC-5 hard red spring wheat | (s) | GC-15 soybean | (s) |
| GC-6 soft red winter wheat | (s) | GC-16 cotton | (s) |
| GC-7 hard white wheat | (s) | GC-17 grain sorghum | |
| GC-8 soft white wheat | (s) | GC-18 dent corn | (s) |
| GC-9 durum wheat | (s) | GC-19 pop corn | (s) |
| GC-10 oat | | GC-20 canola | (s) |

Forage Crops (FC)

- | | | | |
|--------------------------|-----|-------------------------|-----|
| FC-22 orange sorgo | (s) | FC-33 switchgrass | (p) |
| FC-23 sumac sorgo | (s) | FC-34 Indiangrass | (p) |
| FC-24 sudangrass | | FC-35 sand lovegrass | (p) |
| FC-25 foxtail millet | | FC-36 blue grama | (p) |
| FC-26 tall fescue | | FC-37 sideoats grama | (p) |
| FC-27 Kentucky bluegrass | | FC-38 sweetclover | |
| FC-28 orchardgrass | | FC-39 red clover | |
| FC-29 smooth bromegrass | | FC-40 alfalfa | |
| FC-30 buffalograss | | FC-41 white clover | |
| FC-31 big bluestem | (p) | FC-42 birdsfoot trefoil | |
| FC-31 little bluestem | (p) | FC-43 Korean lespedeza | |

Noxious Weeds* (NW)

- | | |
|----------------------------|----------------------|
| NW-1 quackgrass | Elytrigia repens |
| NW-2 hoary cress (p) | Cardaria draba |
| NW-3 musk thistle | Carduus nutans |
| NW-4 | |
| NW-5 Canada thistle | Cirsium arvense |
| NW-6 field bindweed | Convolvulus arvensis |
| NW-7 woollyleaf bursage | Ambrosia grayi |
| NW-8 johnsongrass | Sorghum halepense |
| NW-9 sericea lespedeza (p) | Lespedeza cuneata |
| NW-10 bull thistle (p) | Cirsium vulgare |
| hogpotato** | Hoffmanseggia glauca |
| leafy spurge** | Euphorbia esula |
| Texas blueweed ** | Helianthus ciliaris |
| kudzu** | Pueraria lobata |
| multiflora rose ** | Rosa multiflora |
| Russian knapweed ** | Acroptilon repens |

* Scientific name is given to make sure the proper species is used.

** Will not be used in the event.

Restricted Weeds (RW)

RW-9	wild carrot	(p)	Daucus carota
RW-10	bushy wallflower	(p)	Erysimum repandum
RW-11	common cocklebur		Xanthium strumarium
RW-12	jointed goatgrass		Aegilops cylindrica
RW-13	wild onion or garlic		Allium canadense or vineale
RW-14	downy brome		Bromus tectorum
RW-15	cheat		Bromus secalinus
RW-16	dodder		Cuscuta spp.
RW-17	morningglory		Ipomoea hederacea or purpurea
RW-18	wild buckwheat		Polygonum convolvulus
RW-19	curly dock		Rumex crispus
RW-20	giant foxtail	(p)	Setaria faberi
RW-21	horsenettle		Solanum carolinense
RW-22	silverleaf nightshade	(p)	Solanum elaeagnifolium
RW-23	field pennycress		Thlaspi arvense
RW-24	velvetleaf		Abutilon theophrasti

Common Weeds (CW)

CW-25	redroot pigweed		Amaranthus retroflexus
CW-26	common ragweed		Ambrosia artemisiifolia
CW-27	giant ragweed		Ambrosia trifida
CW-28	sand sagebrush	(p)	Artemisia filifolia
CW-29	prairie threeawn	(p)	Aristida oligantha
CW-30	common lambsquarters		Chenopodium album
CW-31	large crabgrass		Digitaria sanguinalis
CW-32	barnyardgrass		Echinochloa crusgalli
CW-33	horseweed	(p)	Conyza canadensis
CW-34	shepherdspurse	(p)	Capsella bursa-pastoris
CW-35	common broomweed	(p)	Gutierrezia dracunculoides
CW-36	wild sunflower		Helianthus annuus
CW-37	Venice mallow		Hibiscus trionum
CW-38	little barley	(p)	Hordeum pusillum
CW-39	kochia		Kochia scoparium
CW-40	henbit	(p)	Lamium amplexicaule
CW-41	prostrate knotweed	(p)	Polygonum aviculare
CW-42	Pennsylvania smartweed		Polygonum pensylvanicum
CW-43	Russian thistle		Salsola iberica
CW-44	yellow foxtail		Setaria glauca
CW-45	green foxtail		Setaria viridis
CW-46	buffalobur		Solanum rostratum
CW-47	shattercane		Sorghum bicolor
CW-48	common chickweed	(p)	Stellaria media
CW-49	puncturevine		Tribulus terrestris
CW-50	ironweed	(p)	Veronia spp.
CW-51	prickly lettuce	(p)	Lactuca scariola
CW-52	yellow nutsedge	(p)	Cyperus esculentus

Grain Grading - Classes 4-6

Grain grading in accordance with the Official U.S. Standards for Grain. Grain standard booklets can be ordered from the Kansas State University Department of Agronomy.

1. Three samples will be graded in 20 minutes. 150 points total (50 points per sample).
2. Samples are 8 ½ x 11 inch cards with a grain base sample, given card factors, and mounted visual factors. An example of a grain grading sample is included at the end of this section.
3. Samples will be selected from corn, sorghum, soybeans, or wheat.
4. Students must visually determine class, subclass, damage(s), foreign material, other grains, and splits. All other grading factors, including special grades, will be given as card factors on the grain grading cards.
5. Contestants will examine given factors and visual factors on the grain grading card and give the complete grade designation and determining factors. No factors are listed for grade U.S. No. 1.

Example

Grain:	Wheat Test weight - 57.0 lbs. Odor - Smutty Dockage - 0.34%
Card and visual factors:	Rye - 5.3% Heat damaged wheat - 3.3% Insect damaged wheat - 7.8% Dark, hard vitreous kernels - 68%
Complete grade designation:	U.S. Sample Grade Northern Spring Wheat, Light Smutty, Dockage 0.3%
Determining factor(s):	Foreign material Heat-damaged kernels

1. Contestants are permitted to highlight selected information and/or add notes relative to Grain Grading as desired in their Official Grain Standards booklets. It is not permitted to add information regarding identification tips or pictures for grain classes, types of damages, etc.
2. Not all classes, subclasses, and special grades included in the Official U.S. Standards for Grain will be used in the event. The following classes, subclasses, special grades and other special rules will apply to the event:
 - A. Corn
 - a. Class - White, Yellow, or Mixed. Determined by inspection of base sample or from visual factors.
 - b. Special grade – Infested
 - c. Sweet corn and pop corn in corn are foreign material and may be shown on cards.
 - B. Sorghum
 - a. Class - Sorghum
 - b. Special grades - Infested, Smutty
 - c. Dockage - reported in whole percents with fractions of a percent being disregarded (i.e. 1.9% = 1%)
 - d. Non-grain sorghum found in grain sorghum is foreign material and may be used to

determine the grade. Non-grain sorghum includes broomcorn, sorgo, sudangrass, and johnsongrass.

- C. Soybeans
- a. Class - Yellow, Mixed. Determined by inspection of base sample or from visual factors.
 - b. Specials grades – Garlicky, Infested, Purple mottled or stained.
 - c. Soybeans of other colors is not a grading factor for the class Mixed soybeans.
- D. Wheat
- a. Class - Hard Red Winter, Soft Red Winter, Hard Red Spring, Hard White, and Mixed. Determined by inspection of base sample or from visual factors.
 - b. Subclass - Dark Northern Spring, Northern Spring, Red Spring (When grading hard red spring wheat, the subclass is listed in the grade designation and not the class.)
 - c. Special grades - Ergoty, Garlicky, Infested, Light Smutty, Smutty.
 - d. Dockage - rounded to the nearest 0.1 percent and stated in tenths or whole and tenths percent (i.e. 1.05% = 1.1%; minimum listed in the grade designation is 0.1%).
 - e. Wheat with more than 10 % CCL or WOCL is Mixed Wheat, not Sample Grade.
8. For the special grade infested, live weevils (lw) will include rice weevils, granary weevils, cowpea weevils, maize weevils, and lesser grain borers. Other live insects injurious to stored grains (oli) will include Angoumois grain moth, Indian meal moth, saw-toothed grain beetle, confused flour beetle, red flour beetle, vetch bruchids and the larvae of any of these insects. Insects will be given as card factors on the grading card. Any live insects in the samples are unintended and should be disregarded.
9. For the special grade garlicky, 1 green garlic bulblet equals 3 dry or partly dry bulblets. Green garlic bulblets have retained all their husks. Dry or partly dry bulblets have lost all or part of their husks.
10. Only dockage-free grain samples will be used, but dockage removed may be given as a card factor.
11. Sample weights for determining factors are given in the standards handbook as an approximation. For example; if a factor is determined on 1000 g, it can be determined on a sample of approximately 1000 to 1050 g. Thus, a soybean sample with 5 green garlic bulblets in 1045 g would be garlicky.
12. Scoring system
- A. Grade
- a. Correct = 18 points
 - b. 1 grade off (i.e. No. 3 if key has No. 2) = 12 points
 - c. 2 grades off (i.e. No. 4 if key has No. 2) = 6 points
 - d. 3 grades off (i.e. No. 5 if key has No. 2) = 0 points
- B. Class
- a. Corn, sorghum, soybean, soft red winter wheat, hard red winter wheat, and hard white wheat
 - I. Correct = 12 points
 - II. Incorrect = 0 points
 - b. Hard red spring wheat
 - I. Correct = 6 points
 - II. Incorrect = 0 points
- C. Subclass
- a. Hard red spring wheat

- II. Correct = 6 points
 - III. Incorrect = 0 points

- D. Special grades
 - a. Deduct 5 points for each special grade (including dockage) omitted and for each listed but not on the key.
 - b. Special grades should be listed in alphabetical order as shown in Rules 7.A.b, 7.B.b, 7.C.b, and 7.D.c.

- E. Wrongly written
 - a. Deduct 1 point for each grade, special grade, or dockage wrongly written, e.g. hrw for hard red winter, dkg for dockage

- F. Determining factors
 - a. No factor (U.S. No. 1)
 - I. None listed = 20 points
 - II. One or more factors listed = 0 points
 - b. One factor
 - I. Correct = 20 points
 - II. Incorrect = 0 points
 - c. Two factors
 - I. Correct = 20 points
 - II. 1 incorrect = 10 points
 - III. 2 incorrect = 0 points
 - d. Three factors
 - I. Correct = 20 points
 - II. 1 incorrect = 14 points
 - III. 2 incorrect = 7 points
 - IV. 3 incorrect = 0 points
 - e. Four factors
 - I. Correct = 20 points
 - II. 1 incorrect = 15 points
 - III. 2 incorrect = 10 points
 - IV. 3 incorrect = 5 points
 - V. 4 incorrect = 0 points

- G. Extra determining factors
 - a. When the number of factors listed by the contestant exceeds the number on the key, scoring is on the basis of the number listed by the contestant; e.g. If the contestant lists three factors, of which two are correct, and the key only lists two factors, the contestant is given 14 points.

- H. Reference Materials
 - a. Grain Grading Standards for wheat, corn, soybeans, and sorghum, and Stored Grain Insects, Grain Grading Tutorials (procedures) on CD-ROMs and online, etc. are available in Education and Outreach section under Educational Materials and eLearning sections of the USDA Federal Grain Inspection, Packers and Stockyards Administration (GIPSA) homepage at www.gipsa.usda.gov. Electronic Grain Grading Publications EP95, 96, 97, and 98 for corn, grain sorghum, soybeans, and wheat are available for downloading from the KSU Grain Science Library at www.oznet.ksu.edu/library/grsci2 (note: sorghum table has not been updated for changes made in June, 2008)

Seed Analysis - Classes 7-9

Contestants will find and identify crop and weed seeds in a base sample of a common crop.

1. Three samples will be analyzed in 20 minutes. 150 points total (50 points per sample).
2. The samples will be selected from the following crops: alfalfa, grain sorghum, wheat, oat, barley, rye, and soybean. The seed quantities before the addition of impurities will be 5 grams of alfalfa; 30 grams of grain sorghum, oat, wheat, barley, and rye; and 65 grams of soybean.
3. Contestants can use forceps, flat-sided sticks, magnifying lenses, and one seed analysis picking board to aid in seed analysis separations. Seed analysis boards must not exceed 9 x 12 inches.
4. Admixtures will be named according to common names as in the identification list except as indicated in rule number seven, special rules for specific crops.
5. The contestant must classify all seeds mixed with the base sample. The seeds will be classified as either (a) other crops and/or varieties, (b) noxious weeds, (c) restricted weeds, or (d) common weeds.
6. No less than three seeds of any one impurity will be added to a sample. All crop and weed seeds must be mature. Only impurities listed as permissible on the identification list may be used.
7. Special rules for specific crops
 - A. Wheat - Base material will be any pure sample of wheat.
 - a. Hard red spring or soft red winter wheats will not be used as mixtures in hard red winter wheat. Two or more red wheats will not be used as admixtures in the same sample or another crop.
 - b. Wheat types used as admixtures in other crops will be identified only as red wheat, white wheat, and durum wheat.
 - B. Oat - Base material will be any pure sample of white or yellow oat.
 - a. Gray, black and hulled oat will not be used as admixtures in oat or other crop samples.
 - b. White and yellow oat will not be intermixed.
 - c. Any cultivated oat found as an admixture in other crop samples will be identified only as oat.
 - C. Grain sorghum - Base material will be any pure sample of yellow grain sorghum.
 - a. Sudangrass and shattercane must be shown in the glumes.
 - D. Alfalfa - Base material will be any pure sample of alfalfa.
 - a. Sweetclover will not be used as an admixture in alfalfa.
 - E. Soybean - Base material will be any yellow soybean variety.
 - a. Varietal mixtures will not be used.

8. Seed Analysis Scoring system
- A. The total score per sample will be 50 points.
 - B. The following points will be allotted for proper classification of each impurity; other crops and/or varieties 1, noxious weeds 3, restricted weeds 2, and common weeds 1. The deduction will be according to the category where it belongs rather than where the contestant has placed it.
 - C. The remaining points will be allotted equally, or approximately so, for the proper identification of the impurities. The term approximately is used to allow scoring in whole points. (Subtract the total points allotted to classification from 50 and divide the remainder by the number of impurities present.)
 - D. When less than four impurities are present, no more than 12 points (total for classification and identification) will be allotted to each. This allows a maximum deduction of 12 points for any impurity not identified. In a sample with 0-3 impurities, other crops and/or varieties = 10 points, noxious weeds = 12 points, restricted weeds = 11 points, and common weeds = 10 points.
 - E. The contestant who names an impurity which is not present will be penalized approximately one-half of the points allotted to the proper identification only of an impurity present.
 - F. If a contestant calls an impurity in a sample which contains none, 12 points will be deducted, giving a score of 38 points. Two impurities in a pure sample will cause a loss of 24 points, etc.

Agronomic Quiz and Calculations - Class 10

AGRONOMIC QUIZ:

A general knowledge quiz focused primarily on Crop Science but also including questions from Weed Science and Soils (including soil conservation and water quality) will be used. The quiz will consist of 30 multiple choice questions, 4 points each, 120 points total. calculations related to fertilizer application, seeding rates, pure live seed, plant population, harvest losses, yield estimation, sprayer calibration, etc. General knowledge questions will cover basic principles of crop production and soil management, including plant growth processes and crop development, tillage and seedbed preparation, variety selection, seeding, essential nutrients and fertilization practices, pest development and pest control (weeds, insects, diseases), water management, harvest factors and crop quality effects, and residue management. Focus will be on major grain crops (wheat, corn, sorghum, soybean, sunflowers, canola) and forages (alfalfa, fescue, brome grass, native range) grown in Kansas. Some questions will require comparison of different crops for production data (KS, USA, world), uses and products, grain or forage quality, growth habit or adaptation, critical growth stages for stress, etc. Questions may include topics related best management practices for preserving environmental quality, water quality, soil conservation, and sustainability.

Students will have 40 minutes to complete the quiz and calculations.

Example Questions:

- A 1. The growth habit of corn is a) summer annual b) winter annual c) perennial
d) biennial.
- C 2. The wheat variety brought to Kansas by Mennonites in 1874 that began our wheat industry was
a) Newton b) Pawnee c) Turkey d) Karl e) Crimean.
- A 3. The test weight per bushel for soybeans is a) 60 b) 56 c) 50 d) 48 pounds.

AGRONOMIC CALCULATIONS:

Each participant will also perform six agronomic calculations and provide the correct solution (including correct units and rounded as requested) or select the correct multiple choice solution. 30 points total, 5 points each.

Calculations may include pure-live seed content, seeding rate, plant population, harvest loss, fertilizer application, pesticide application, cost of active ingredients, sprayer calibrations, or other agronomic calculations.

Contestants are expected to know common measurements such as square feet/acre, oz/pint, pints/gal, bushel weights, feet/mile, etc. Formulas for sprayer calibration, row feet/acre, etc. may be given.

Answers for Agronomic Calculations will be rounded to a whole number or one or two decimals as logical and appropriate, e.g., plant population (whole number), seeding rate (0.1 pound), etc. Work must be shown to allow contest graders to evaluate for correct procedures for "rounded" answers.

Examples:

1. If a producer counts an average of two plants per foot of row in eight inch drill rows, what is the plant population per acre? ANS: 130,680 plants/acre
2. A producer wants to check the seeding rate of a 30 foot grain drill. In a 100 foot long test strip, 4.0 pounds of wheat is collected. What is the seeding rate in lbs/acre? ANS: 58.1 lbs/acre
3. "Superstuff" pesticide is a liquid formulation that contains 40% a.i., weighs 9 lb/gal, and costs \$18.95 per gallon. What is the cost per pound of a.i.? ANS: \$5.26/pound a.i.
4. If a producer finds 8 soybeans per square foot on the ground after harvest and the variety has 2500 seeds/pound, what is the field loss in bu/acre? ANS: 2.3 bu/acre

REFERENCES:

This list of references is not intended to be inclusive. Other sources may be utilized and teachers are encouraged to use the best available instructional materials.

Alfalfa, Corn, Grain Sorghum, Soybean, and Wheat Production Handbooks. KSU AES and CES Publications. (Agronomy Department).

Corn, Grain Sorghum, Soybean, and Wheat Plant Development Publications.

Class 11 - Practicum

A general knowledge practicum consisting of 37 stations where students will perform simple analyses or answer questions such as: determine soil texture by feel; interpret herbicide, seed, and/or fertilizer labels; answer questions from publications such as a *Soil Survey Report*, *Weed Control Handbook*, *Crop Planting Guide*, or *Crop Variety Trial* reports; write or interpret legal land descriptions; interpret soil test recommendation reports; identify insects, diseases, and common agronomic equipment; identify weeds in the vegetative stage; identify common fertilizer carriers, ag lime, inoculum, etc.; name common nutrient deficiencies shown on crop plants (N, P, K, S, Fe); identify the crop from which various feed ingredients are made (ie. soybean meal, wheat bran, alfalfa pellets); identify growth stages of major crop plants (corn, wheat, sorghum, soybean); name common plant structures (on seeds, seedlings, roots, stems, leaves, or flowers). Students will have 40 minutes to complete the Practicum.

Resources:

1. Kansas State Research and Extension – Many crops publications available at www.ksre.ksu.edu
2. Soil Texture by Feel Procedure - S.J. Thien, KSU Agronomy Department
3. Soil Texture Triangle
4. County Soil Survey Publications - Local NRCS or County Extension Office, or Web Soil Survey at websoilsurvey.nrcs.usda.gov
5. Most recent Chemical Weed Control Handbook. KSRE Report of Progress.
6. Kansas Crop Planting Guide – KSRE Publ. L-818.
7. Identifying Caterpillars in Corn, Sorghum, Soybeans. KSRE Publ. (Entomology Dept.)
8. How a Corn Plant Develops (SR 0048) Iowa State Univ. Extension
9. Soybean Growth and Development (PM 1945) Iowa State Univ. Extension
10. How a Sorghum Plant Develops (KSRE Publication – Agronomy Dept.)
11. High Plains Sunflower Production Handbook (KSRE – Agronomy Dept.)

Identify important DISEASES, from the following list (plants or pictures).

- | | |
|--------------------------------------|---------------------------------------|
| 1. bacterial blight of soybean | 13. leaf rust of wheat |
| 2. bacterial wilt of alfalfa | 14. leaf spot of alfalfa |
| 3. barley yellow dwarf virus (wheat) | 15. loose smut of wheat |
| 4. blacktip of wheat | 16. Northern corn leaf blight |
| 5. blue eye mold (corn kernel) | 17. Phytophthora root rot (soybean) |
| 6. bean pod mottle virus (soybean) | 18. rust (corn, sorghum, soybean) |
| 7. charcoal rot of sorghum | 19. pod and stem rot of soybean |
| 8. corn smut | 20. purple seed stain of soybean |
| 9. ergot (sorghum, wheat) | 21. stem rust of wheat |
| 10. ear rot (corn) | 22. wheat scab |
| 11. Gibberella stalk rot (corn) | 23. wheat streak mosaic virus (wheat) |
| 12. gray leaf spot (corn, sorghum) | |

Identify important INSECTS from the following list (preserved specimens or pictures).
(a = adult, l = larvae)

- | | | | |
|----|-------------------------|-----|-------------------------|
| 1. | alfalfa weevil (a) | 9. | European corn borer (l) |
| 2. | aphids | 10. | fall armyworm (l) |
| 3. | bean leaf beetle | 11. | grasshopper (a) |
| 4. | black cutworm (l) | 12. | green cloverworm (l) |
| 5. | blister beetle (a) | 13. | lacewing (a) |
| 6. | chinch bug | 14. | lady beetle (a) |
| 7. | corn earworm (l) | 15. | painted lady |
| 8. | corn rootworm (l and a) | 16. | stinkbug (a) |

Identify VEGETATIVE stage of important WEEDS from the following list (live plants).

- | | | | | | |
|----|----------------------|-----|------------------------|-----|----------------------|
| 1. | barnyardgrass | 7. | field bindweed | 13. | redroot pigweed |
| 2. | cheat | 8. | field pennycress | 14. | velvetleaf |
| 3. | common cocklebur | 9. | green foxtail | 15. | Venice mallow |
| 4. | common lambsquarters | 10. | large crabgrass | 16. | yellow foxtail |
| 5. | common ragweed | 11. | morningglory | 17. | yellow nutsedge |
| 6. | wild sunflower | 12. | Pennsylvania smartweed | 18. | pinnate tansymustard |

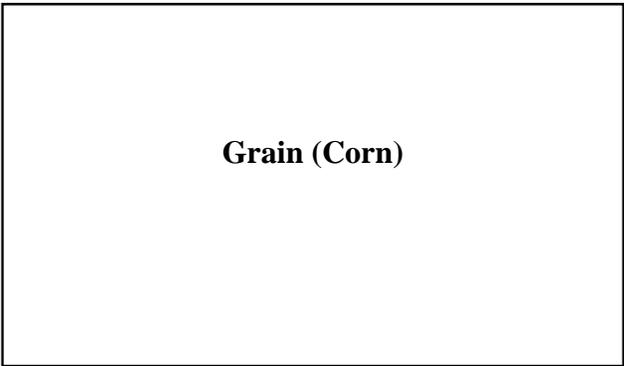
Identify EQUIPMENT AND MACHINERY commonly used in crop production from the following list
(pictures, models, actual items)

- | | | | |
|-----|--------------------------|-----|------------------------------------|
| 1. | combine | 14. | nozzle bodies (flood vs. flat fan) |
| 2. | cotton picker | 15. | row crop planter |
| 3. | disc | 16. | plow |
| 4. | field cultivator | 17. | press wheel |
| 5. | gauge wheel | 18. | rake |
| 6. | GPS receiver & light bar | 19. | ripper |
| 7. | grain auger | 20. | rotary hoe |
| 8. | grain moisture meter | 21. | soil probe |
| 9. | grain storage bin/dryer | 22. | soil thermometer |
| 10. | grain drill | 23. | sprayer |
| 11. | hay baler | 24. | swather |
| 12. | hydraulic line | 25. | tractor |
| 13. | mower | 26. | yield monitor |

Example Grain Grading Card:

**Kansas State Career Development Events in Agriculture
Crops Event
Grain Grading**

Corn	4	District 2012
Crop	Sample Number	Event



Card Factors

Test Weight per bushel - 56.0 lbs/bu
Odor - Natural
A representative sample contained 2 live weevils and 4 other insects injurious to stored grain
Material passing through a 12/64 round-hole sieve - 1.9%
Cocklebur - 7

Visual Factors

<u>Sample</u>	1.7%	<u>Sample</u>	0.6%
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<u>Sample</u>	2.5%	<u>Sample</u>	0.9%
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Example Seed Analysis Answer Sheet and Scoring System:

**Kansas State Career Development Events in Agriculture
Crops Event
Seed Analysis**

Contestant No. _____

Total Score _____

Sample No. 7

Sample Name: Soybeans

A. Other Crops and/or Varieties	C. Restricted Noxious Weeds
- 1 Foxtail millet (4) - 6	- 2 Horsenettle (5) - 6
- 1 Korean lespedeza (4) - 6	
B. Prohibited Noxious Weeds	D. Common Weeds
- 3 Canada thistle (5) - 6	- 1 Green foxtail (5) - 6
- 3 Hoary cress (6) - 6	

50 points possible

minus 11 classification points

Admixtures 39 points

6 points per admixture (39/6 admixtures)

Deduct 3 for each admixture not in sample (½ points for each admixture)

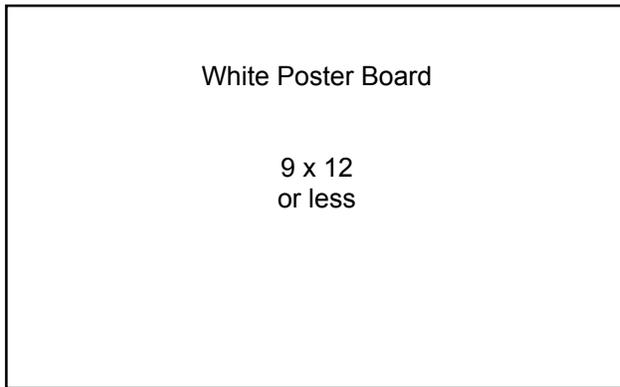
Number's in () parenthesis denote number of seeds added to sample

Seed Analysis Picking Board

You may wish to construct a small board (9 in x 12 in or smaller) on which to separate the seed analysis samples. You can bring one board per team.

Materials needed:

Heavy, white poster board
Cardboard for edging
Glue or Tape (clear scotch, strapping, or adhesive)



← Use glue or tape too hold cardboard edge on the board



A pour spout can be made by filling a gap with a removable piece of cardboard