

AGRONOMY

Sponsored by:
Department of Plant and Soil Sciences
Oklahoma State University
Division of Agricultural Sciences and Natural Resources

Contest Superintendent

Sarah Lancaster
368 Ag Hall
(405) 744-3525
sarah.lancaster@okstate.edu

Contest Details

Date: Saturday, April 25, 2009
Time: 8:00 am
Location: 275 Ag Hall

Pre-Registration Form

Please fill out a pre-registration form (appendix B) and submit to contest superintendent before April 20, 2009. This enables us to know how many students are participating in the event in order to prepare properly.

Contest Purpose, Objectives, Rules and Guidelines

Purpose:

To create an interest in and promote the understanding of agronomy through the demonstration of skills and proficiencies.

Objectives:

1. To demonstrate basic knowledge of agronomic principles and practices.
2. To explore career opportunities, skills, and proficiencies in the agronomic industry.
3. To measure the students' ability to:
 - Identify agronomically important crops and weeds
 - Measure seed quality using standard grading practices
 - Determine forage quality for use as animal feed
 - Demonstrate an understanding of input management
 - Apply factual knowledge in order to make sound agronomic decisions
4. To apply science and mathematics in order to solve real-world agricultural problems.

5. To challenge oneself and find success.

General Information

District Event Dates (These will be updated as made available)

Date	District	Location	Time

Format for 2009

1. The event consists of three parts.
 - a. Plant and Seed Identification
 - b. Practicum
 - c. General Agronomic Knowledge
2. The *practicum topics* will be:
 - a. Grain grading
 - b. Pest management
 - c. Seed analysis
3. In grain grading, information for all grade-determining factors will be submitted and used in scoring. Scratch paper will not be allowed. All information will be recorded and shown by the student on the official grading sheet.
4. In seed analysis the identification of the base sample will be given. One point will be deducted for incorrect spelling. See the following description for details on base samples and admixtures.
5. Questions for the general agronomic knowledge examination will come from the *2007 Peanut Production Guide for Oklahoma*. Hardcopies of the *2007 Peanut Production Guide for Oklahoma* may be ordered from your county extension educator or downloaded from the internet at: <http://www.peanut.okstate.edu/prodinfo/index.htm>.
6. Questions for the pest management examination will come from the *2007 Peanut Production Guide for Oklahoma*. Study materials for pest identification will be posted on the web at www.casnr.com.
7. See General Rules and Regulations (below) for parameters to decide ties.

GENERAL RULES AND REGULATIONS

1. These rules and regulations are official for the State FFA Interscholastic Career Development Event in Agronomy through 2009. They may be supplemented as necessary after consultation with Agricultural Education officials. Changes will be communicated at www.casnr.com
2. The State FFA Interscholastic Career Development Event in Agronomy will be held in Agriculture Hall on the campus of Oklahoma State University in Stillwater in April of each year. The contest is sponsored and conducted by the Department of Plant and Soil Sciences and OSU Crops Judging Team. The exact date and time will be announced in promotional materials distributed by the Interscholastic Coordinator in the Division of Agricultural Sciences and Natural Resources at Oklahoma State University.
3. Coordinators of district and invitational contests throughout the state are encouraged to follow these rules for their contests, but they are not required to do so. The sponsoring institutions are fully responsible for all set-up, operation, supervision, interpretation of rules, scoring, tabulation, and awards for district invitational contests. The OSU Department of Plant and Soil Sciences prepares contest materials for purchase by district contest sponsors if requested. Distribution of materials after the contest is the responsibility of the sponsoring institution. The location and time of district and invitational contests will be announced annually by the sponsors.
4. Teams may be entered by any Oklahoma high school approved for competition by the Agriculture Division, Oklahoma State Department of Vocational/Technical Education. Any student entering the contest must be a regularly enrolled agricultural education student and eligible for competition under High School Athletic Association Rules.
5. A team may consist of four members. The top three scores will be counted for the team total. If an entire team is not entered, one or two individuals from a school may compete for individual honors.
6. All participants will be given an assigned number by which they will be designated throughout the event. Participants will be assigned to group leaders who will escort them to various event-staging sites. Each participant is to stay with the assigned group until they are told otherwise by the contest supervisor.

7. The contest will consist of three parts, 40 minutes each, scored as follows:

Part 1	Plant and Seed Identification	75 samples	300 points
Part 2	Grain Grading	4 samples	200 points
	Lab Practicum	20 questions	100 points
Part 3	Seed Analysis	4 samples	200 points
	General Agronomic Knowledge	30 questions	150 points

Total: 950 points

8. Lists of the plants and seeds which may be used in identification and seed analysis, as well as official contest answer forms, are attached and will be considered a part of these rules and regulations.

9. The coaches will have the privilege of checking all materials used after the contest is over. A coach shall not object to anything being included in the contest because it was not secured for study.
10. The contestants will not communicate with other contestants or anyone else except the officials in charge while the contest is under way. Contestants may be asked to work on pre-assigned tables or samples at the direction of the supervisor.
11. Magnifying lens, forceps, writing board, pencil or pen, calculator, and watch include the materials a contestant may take into the contest area. Students may use pre-made scratch paper forms for keeping notes during forage evaluation, if approved by the contest supervisor. Answer lists for identification will be provided when a contestant enters the identification area. They must be turned in with the answer sheet when the ID section is completed.
12. Legible writing and spelling are required and will be considered in scoring. Points will be deducted for misspelling.
13. Ties will be broken based upon scores in plant and seed identification. If the tie remains unbroken, scores in seed analysis and then general agronomic knowledge will be used to break the tie.
14. In view of fairness to all schools, no team will be permitted to practice in the OSU crops teaching laboratory, except during supervised training workshops conducted prior to the contest.
15. Trophies and certificates for winners are presented by the OSU Division of Agricultural Sciences and Natural Resources. The Department of Plant and Soil Sciences offers a scholarship to the high individual in the state contest if he or she attends Oklahoma State University and majors in Plant and Soil Sciences. Opportunity also exists for participation on the OSU Collegiate Crops Team.

PART 1- PLANT AND SEED IDENTIFICATION

1. The contestant will identify a total of 75 grain or forage crop plants and seeds and weed plants and seeds in a period of 40 minutes. It is possible that the same species may occur more than one time in the contest. Each sample will be given a value of 4 points, for a total of 300 points.
2. Contest samples will be either seeds or plants. Refer to the attached identification list to determine which form(s) may be shown for each crop or weed.
3. A numbered answer list of names arranged in alphabetical order including all samples on the official identification list will be included with the official identification form used by the contestant. The contestant will identify each sample, then select the appropriate number from the answer list and record that number in a box next to the sample number. The contestant may write out the name of the sample in the space provided if desired, but the official scoring will be based on the answer number in the box only. Both pages of the form must be turned in when the contestant is finished with the identification section.
4. Plants will generally be shown in the reproductive stage (flower bud through seed maturity). Pressed, dried mounts will most often be used for plant samples. Dried and bundled, fresh cuttings or live plants may also be utilized when available. Seeds will be displayed in open pans. A magnifying lens is suggested to aid in identification.

OKLAHOMA FFA IDENTIFICATION LIST

Samples will be shown in contests as indicated by the following symbols:

(s) seed only; (p) plant only; (e) either seed or plant;

species not included in this year's contest

(*)

SMALL GRAINS

Hard red winter wheat (e)
Soft red winter wheat (s)
Hard white wheat (s)
Soft white wheat (s)
Durum wheat (s)
Barley (e)
Oats (e)
Rice (e)
Rye (e)
Triticale (s)

CORN, SORGHUM AND MILLET

Yellow dent corn (e, ear or tassel)
White dent corn (s)
Pop corn (s)
Sweet corn (s)
Grain sorghum (e)
White grain sorghum (s)
Tannin grain sorghum (s)
Foxtail millet (s)
Pearl millet (s)
Proso millet (s)

FORAGE GRASSES

Bermudagrass (e)
Big bluestem (e)
Blue grama (e)
Buffalograss (p or bur)
Canada wildrye (e)
Indiangrass (e)
Little bluestem (e)
Perennial ryegrass (e)
Plains bluestem (e)
Sideoats grama (e)
Smooth bromegrass (e)
Switchgrass (e)
Tall fescue (e)
Weeping lovegrass (e)

FORAGE LEGUMES

Alfalfa (e)
Arrowleaf clover (e)
Big hop clover (e)
Crimson clover (e)
Hairy vetch (e)
Korean lespedeza (e)
Red clover (e)
Sericea lespedeza (e)
Sweetclover (e)
White clover (e)

LARGE SEEDED LEGUMES

Austrian Winter fieldpea (s)
Blackeye cowpea (s)
Great Northern fieldbean (s)
Green mungbean (s)
Guar (s)
Lentil (s)
Navy fieldbean (s)
Peanut (e or pod)
Pinto fieldbean (s)
Purplehull cowpea (s)
Yellow soybean (e)

SPECIAL CROPS

Canola (e)
Castorbean (s)
Cotton (e)
Cultivated buckwheat (s)
Flax (s)
Oil sunflower (s)
Safflower (s)
Sesame (s)

PROHIBITED NOXIOUS WEEDS

Field bindweed (e)
Yellow nutsedge (p)

RESTRICTED NOXIOUS WEEDS

Bracted plantain (e)
Cheat (e)
Common cocklebur (e)
Curly dock (e)
Dodder (e)
Horsenettle (p)
Johnsongrass (e)
Jointed goatgrass (e)
Musk thistle (p)
Silverleaf nightshade (p)
Tall morningglory (e)
Wild buckwheat (e)
Wild garlic (bulblet)
Wild oats (s)

COMMON WEEDS

Barnyardgrass (e)
Black medic (p)
Buffalobur (e)
Common lambsquarters (e)
Common sunflower (e)
Crabgrass (e)
Cutleaf primrose (e)
Downy brome (e)
Giant ragweed (e)
Goosegrass (p)
Green foxtail (e)
Greenflower pepperweed (e)
Henbit (p)
Honeyvine milkweed (p)
Kochia (e)
Little barley (p)
Pennsylvania smartweed (e)
Puncturevine (e)
Redroot pigweed (e)
Rescuegrass (e)
Sandbur (e)
Shepherdspurse (e)
Velvetleaf (e)
Venice mallow (e)
Yellow foxtail (e)

Contestant No. _____

Total Score _____

Identify each numbered sample using the names from the answer list provided. Write the answer number corresponding to the name in the box next to the sample number. You may use the extra space to write out the name if you wish, but the official scoring will be based on the answer number which you write in the box only. Turn in both pages when you are finished.

No.	Answer No.		No.	Answer No.		No.	Answer No.	
1.			26.			51.		
2.			27.			52.		
3.			28.			53.		
4.			29.			54.		
5.			30.			55.		
6.			31.			56.		
7.			32.			57.		
8.			33.			58.		
9.			34.			59.		
10.			35.			60.		
11.			36.			61.		
12.			37.			62.		
13.			38.			63.		
14.			39.			64.		
15.			40.			65.		
16.			41.			66.		
17.			42.			67.		
18.			43.			68.		
19.			44.			69.		
20.			45.			70.		
21.			46.			71.		
22.			47.			72.		
23.			48.			73.		
24.			49.			74.		
25.			50.			75.		

ANSWER LIST FOR IDENTIFICATION

CROPS and FORAGES

1. Alfalfa
2. Arrowleaf clover
3. Austrian Winter fieldpea
4. Barley
5. Bermudagrass
6. Big bluestem
7. Big hop clover
8. Blackeye cowpea
9. Blue grama
10. Buffalograss
11. Canada wildrye
12. Canola
13. Castorbean
14. Cotton
15. Crimson clover
16. Cultivated buckwheat
17. Durum wheat
18. Flax
19. Foxtail millet
20. Grain sorghum
21. Great Northern fieldbean
22. Green mungbean
23. Guar
24. Hairy vetch
25. Hard red winter wheat
26. Hard white wheat
27. Indiangrass
28. Korean lespedeza
29. Lentil
30. Little bluestem
31. Navy fieldbean
32. Oats
33. Oil sunflower
34. Peanut
35. Pearl millet
36. Perennial ryegrass
37. Pinto fieldbean
38. Plains bluestem
39. Pop corn
40. Proso millet
41. Purplehull cowpea
42. Red clover
43. Rice
44. Rye
45. Safflower
46. Sericea lespedeza
47. Sesame
48. Sideoats grama
49. Smooth brome grass
50. Soft red winter wheat
51. Soft white wheat
52. Sweetclover
53. Sweet corn
54. Switchgrass
55. Tall fescue
56. Tannin grain sorghum
57. Triticale
58. Weeping lovegrass
59. White clover
60. White dent corn
61. White grain sorghum
62. Yellow dent corn
63. Yellow soybean

WEEDS

72. Crabgrass
73. Curly dock
74. Cutleaf primrose
75. Dodder
76. Downy brome
77. Field bindweed
78. Giant ragweed
79. Goosegrass
80. Green foxtail
81. Greenflower pepperweed
82. Henbit
83. Honeyvine milkweed
84. Horsenettle
85. Johnsongrass
86. Jointed goatgrass
87. Kochia
88. Little barley
89. Musk thistle
90. Pennsylvania smartweed
91. Puncturevine
92. Redroot pigweed
93. Rescuegrass
94. Sandbur
95. Shepherdspurse
96. Silverleaf nightshade
97. Tall morningglory
98. Velvetleaf
99. Venice mallow
100. Wild buckwheat
101. Wild garlic
102. Wild oats
103. Yellow foxtail
104. Yellow nutsedge

PART 2- Grain Grading and Pest Management Lab Practicum

1. In this section, the contestant will complete two practical components in a period of 40 minutes. This section is worth a total of 300 points.
 - a. For 2009 the topics will be:
 - i. Grain Grading
 - ii. Nutrient Management
2. Specific guidelines for each section are given below:

Grain grading

1. Four samples of grain will be graded according to the Federal Grain Standards. Each sample is worth 50 points per sample for a total of 200 points.
2. The samples will be from the following classes: Hard Red Winter Wheat, Mixed Wheat; Sorghum, White Sorghum, Tannin Sorghum, Mixed Sorghum, Yellow Corn, White Corn, Mixed Corn, Yellow Soybeans, and Mixed Soybeans.
3. Samples will consist of cards with seeds glued to various areas representing a commercial grading sample which has already been separated. Each sample will include a master sample of the grain to be graded, the necessary card factors, and several visual factors. The master sample must be examined to determine the predominating market class of the crop. Card factors are those which cannot be determined by the student, and for which values must be given. Included are test weight per bushel, odors, percent of material sieved from the sample, certain sample grade factors, and all factors determining the special grades. The visual factors are small quantities of materials which may affect the commercial quality of the grain, shown with the amount or percentage stated. The effect of each factor on the grade of the sample must be determined. Other market classes, which might cause the grain to be graded as class "mixed", may also be shown as visual factors or may be determined upon examination of the base sample. The contestant must consider all of the evidence accompanying each sample, and record the market grade designation, together with the factors which determine it on the scoring sheet as shown in the examples given at the end of this section. The total number of determining factors will be no more than **six**.
3. Each contestant will be provided with a summary sheet containing the grade requirement table and definitions for special grades, market classes, and grading factors as shown on the following pages. (These summary sheets are abbreviated and may sometimes differ from the actual US Grain Standards. For the Oklahoma event, the guidelines for grade and class determination on the provided summary sheets will apply.)

4. Scoring of each sample of grain grading will be as follows:

Grade determining factors

- A grade for all numerical factors must be given.
- Grade incorrect or not given, deduct 2 points each
- If there should be a factor(s) that determines the grade or changes the class other than information in the numerical factor boxes, this information must be accurately and clearly recorded in the "Remarks" section of the official grading sheet. Other information may also be recorded in this box, but is not required.

Designation (30 points)

- Crop name omitted, deduct 15 points
- Wrong class or class omitted, deduct 5 points
- Special grade wrong or omitted, deduct 3 points each (not more than 6 points)
- One grade off, deduct 5 points
- Two grades off, deduct 10 points
- Three or more grades off, deduct 15 points
- Correct grade wrongly written, deduct up to 4 points - deduct 1 point for each of the following: Wrong abbreviation for "U.S. No.", Number written out; Wrong term used; Words in wrong order; Incorrect punctuation; Words misspelled; All words not capitalized.

Factors (20 points)

- One factor required: Wrong, deduct 16 points
- Two factors required: One wrong, deduct 8 points; Both wrong, deduct 16 points
- Three factors required: One wrong, deduct 5 points; Two wrong, deduct 10 points; Three wrong, deduct 12 points
- Four factors required: One wrong, deduct 4 points; Two wrong, deduct 8 points; Three wrong, deduct 12 points; Four wrong, deduct 16 points
- If more factors are listed than required, value of each wrong extra factor will be 16 divided by the total number of factors listed (dropping any fraction). For example, if two are required by four are listed, deduct $16/4 = 4$ points for each wrong factor.
- Correct factors, wrongly written, deduct up to 4 points - deduct 1 point for each of the following errors: Wrong percent given; Wrong term used; All words not capitalized; Words in wrong order; Words misspelled; "()", "%" omitted.

1. An explanation of the grain grading procedure and requirements with examples is given in **Appendix A.**

GRADE REQUIREMENTS FOR CORN				
Grade	Minimum Test Weight Per Bushel	Maximum Limits of ...		
		Heat-damaged Kernels	Damaged Kernels (Total)	Broken Corn and Foreign Material
	Lbs.	%	%	%
U.S. No. 1	56.0	0.1	3.0	2.0
U.S. No. 2	54.0	0.2	5.0	3.0
U.S. No. 3	52.0	0.5	7.0	4.0
U.S. No. 4	49.0	1.0	10.0	5.0
U.S. No. 5	46.0	3.0	15.0	7.0

U.S. Sample Grade shall be designated for corn that:

- Exceeds the limitations of U.S. No. 5 for any of the above factors; or
- Contains, in a 1000 gram sample: 8 or more stones; 2 or more castorbeans; 8 or more cockleburs; 2 or more pieces of glass; 3 or more crotalaria seeds; 10 or more rodent pellets, bird droppings, or other pieces of animal filth; or
- Has a musty, sour, or commercially objectionable foreign odor (does not include smut or garlic odor); or
- Is heating, contains any commonly recognized harmful or toxic foreign substance, or is otherwise of distinctly low quality.

SPECIAL GRADES

- **Infested** - Infested by live weevils or other live insects injurious to stored grain.

MARKET CLASSES

- **Yellow Corn** - Kernels yellow or yellow with reddish areas, containing not more than five percent of white, red, or other colored kernels.
- **White Corn** - Kernels white or white with pink or yellow tinges with not more than two percent of yellow or other colored kernels.
- **Mixed Corn** - Any sample that does not meet the requirements for the classes Yellow Corn or White Corn.

DEFINITIONS

- **Heat-damaged Kernels** - Heat-damaged kernels of corn only.
- **Damaged Kernels (Total)** - Kernels of corn only which are damaged by insects, mold, sprouting, disease, or other factors, including heat-damaged kernels.
- **Broken Corn and Foreign Material** - All broken corn and foreign material screened from the sample, plus all matter other than corn which remains in the sample.

GRADE REQUIREMENTS FOR SORGHUM					
		Maximum Limits of ...			
Grade	Minimum Test Weight Per Bushel	Heat-damaged Kernels	Damaged Kernels (Total)	Foreign Material	Broken Kernels and Foreign Material
	Lbs.	%	%	%	%
U.S. No. 1	57.0	0.2	2.0	1.5	4.0
U.S. No. 2	55.0	0.5	5.0	2.5	7.0
U.S. No. 3	53.0	1.0	10.0	3.5	10.0
U.S. No. 4	51.0	3.0	15.0	4.5	13.0

U.S. Sample Grade shall be designated for sorghum that:

- Exceeds the limitations of U.S. No. 4 for any of the above factors; or
- Contains, in a 1000 gram sample: 8 or more stones; 2 or more castorbeans; 8 or more cockleburs; 2 or more pieces of glass; 3 or more crotalaria seeds; 10 or more rodent pellets, bird droppings, or other pieces of animal filth; or
- Has a musty, sour, or commercially objectionable foreign odor (does not include smut or garlic odor); or
- Is heating, contains any commonly recognized harmful or toxic foreign substance, or is otherwise of distinctly low quality.

SPECIAL GRADES

- **Infested** - Infested by live weevils or other live insects injurious to stored grain.
- **Smutty** - Covered with smut spores, **or** contains 20 or more smut masses in 100 grams.

MARKET CLASSES

- **Sorghum** - Sorghum with white subcoats and yellow, yellow-red, orange-red, salmon-pink, reddish or white pericarps, or white pericarps with black or reddish spots, with not more than three percent of tannin sorghum.
- **Tannin Sorghum** - Sorghum with brown subcoats (tannin sorghum used in the contest will have only brown pericarps also) with not more than ten percent of sorghum of other colors.
- **White Sorghum** - Sorghum with white pericarps with not more than two percent of sorghum of other colors. White sorghum with more than two percent sorghum (yellow, red, orange or salmon pericarps) and less than three percent tannin sorghum is classified as "Sorghum".
- **Mixed Sorghum** - Sorghum and/or white sorghum with more than three percent tannin sorghum **or** tannin sorghum with more than ten percent of other colors.

DEFINITIONS

- **Heat-damaged Kernels** - Heat-damaged kernels of sorghum **and other grains**.
- **Damaged Kernels (Total)** - Kernels of sorghum **and other grains** which are damaged by insects, mold, sprouting, disease, or other factors, **including heat-damaged kernels**.
- **Foreign Material** - All foreign material screened from the sample, plus all matter other than sorghum which remains in the sample.
- **Broken Kernels and Foreign Material** - All broken kernels screened from the sample **plus** all foreign material as defined above.

GRADE REQUIREMENTS FOR SOYBEANS

GRADE REQUIREMENTS FOR SOYBEANS						
		Maximum Limits of ...				
Grade	Minimum Test Weight Per Bushel	Heat-damaged Kernels	Damaged Kernels (Total)	Foreign Material	Splits	Soybeans of Other Colors
	Lbs.	%	%	%	%	%
U.S. No. 1	56.0	0.2	2.0	1.0	10	1.0
U.S. No. 2	54.0	0.5	3.0	2.0	20	2.0
U.S. No. 3	52.0	1.0	5.0	3.0	30	5.0
U.S. No. 4	49.0	3.0	8.0	5.0	40	10.0**

U.S. Sample Grade shall be designated for soybeans that:

- a) Exceeds the limitations of U.S. No. 5 for any of the above factors; or
- b) Contains, in a 1000 gram sample: 8 or more stones; 2 or more castorbeans; 8 or more cockleburs; 2 or more pieces of glass; 3 or more crotalaria seeds; 10 or more rodent pellets, bird droppings, or other pieces of animal filth; or
- c) Has a musty, sour, or commercially objectionable foreign odor (does not include smut or garlic odor); or
- d) Is heating, contains any commonly recognized harmful or toxic foreign substance, or is otherwise of distinctly low quality.

** A sample with more than 10.0% Soybeans of Other Colors shall be classified Mixed Soybeans and shall be graded with the factor Soybeans of Other Colors disregarded.

SPECIAL GRADES

- **Infested** - Infested by live weevils or other live insects injurious to stored grain.
- **Garlicky** - Five or more garlic bulblets in 1000 grams.

MARKET CLASSES

- **Yellow Soybeans** - Soybeans with yellow or greenish seed coats with not more than 10% soybeans of other colors (black or brown).
- **Mixed Soybeans** - Soybeans with more than 10% soybeans of other colors.

DEFINITIONS

- **Heat-damaged Kernels** - Heat-damaged soybeans only.
- **Damaged Kernels (Total)** - Kernels of soybeans only which are damaged by insects, mold, sprouting, disease, or other factors, including heat-damaged kernels.
- **Foreign Material** - All foreign material screened from the sample, plus all matter other than soybeans which remains in the sample.
- **Splits** - Broken pieces of soybeans that are not otherwise damaged.
- **Soybeans of Other Colors** - Soybeans with black or brown seed coats.

GRADE REQUIREMENTS FOR WHEAT							
			Maximum Limits of ...				
Grade	Minimum Test Weight Per Bushel	Heat-damaged Kernels	Damaged Kernels (Total)	Foreign Material	Shrunken and Broken Kernels	Defects (Total)	Contrasting Classes
	Lbs.	%	%	%	%	%	%
U.S. No. 1	60.0	0.2	2.0	0.4	3.0	3.0	1.0
U.S. No. 2	58.0	0.3	4.0	0.7	5.0	5.0	2.0
U.S. No. 3	56.0	0.5	7.0	1.3	8.0	8.0	3.0
U.S. No. 4	54.0	1.0	10.0	3.0	12.0	12.0	10.0**
U.S. No. 5	51.0	3.0	15.0	5.0	20.0	20.0	----

U.S. Sample Grade shall be designated for wheat that:

- Exceeds the limitations of U.S. No. 5 for any of the above factors; or
- Contains, in a 1000 gram sample: 4 or more stones; 2 or more castorbeans; 8 or more cockleburs; 1 or more pieces of glass; 3 or more crotalaria seeds; 2 or more rodent pellets, bird droppings, or other pieces of animal filth; or
- Has a musty, sour, or commercially objectionable foreign odor (does not include smut or garlic odor); or
- Is heating, contains any commonly recognized harmful or toxic foreign substance, or is otherwise of distinctly low quality.

**A sample with more than ten percent Contrasting Classes shall be classified Mixed Wheat and shall be graded with the factor Contrasting Classes disregarded.

SPECIAL GRADES

- **Light smutty** - Strong odor of smut **or** 5 to 30 smut ball in 250 grams.
- **Smutty** - More than 30 smut balls in 250 grams.
- **Garlicky** - More than 2 garlic bulblets in 1000 grams.
- **Infested** - Infested by live weevils or other live insects injurious to stored grain.

MARKET CLASSES

- **Hard Red Winter Wheat** - Hard Red Winter Wheat with not more than ten percent of wheat of contrasting classes (Durum Wheat and/or White Wheat).
- **Mixed Wheat** - Hard Red Winter Wheat with more than ten percent of wheat of contrasting classes.

DEFINITIONS

- **Heat-damaged Kernels** - Heat-damaged kernels of wheat and other grains.
- **Damaged Kernels (Total)** - Kernels of wheat and other grains which are damaged by insects, mold, sprouting, disease, or other factors, including heat-damaged kernels.
- **Foreign Material** - All foreign material other than wheat which remains in the sample after removal of Shrunken and Broken Kernels.
- **Defects(Total)** - The sum of Damaged Kernels (Total), Foreign Material, and Shrunken and Broken Kernels
- **Contrasting Classes** - Durum wheat and/or white wheat in hard red winter wheat.

Contestant No. _____
 Sample No. _____

Total Score _____

CORN				
Factor Level	Minimum Test Weight Per Bushel	Heat-damaged Kernels	Damaged Kernels (Total)	Broken Corn and Foreign Material
Grade (2pt/e)				
Remarks (2 pts)				

Complete Grade Designation (30 points)	Factor or Factors (20 points)

Contestant No. _____

Sample No. _____

Total Score _____

SORGHUM					
Grade Level	Minimum Test Weight Per Bushel	Heat- damaged Kernels	Damaged Kernels (Total)	Foreign Material	Broken Kernels and Foreign Material
Grade (2pt/e)					
Remarks (2 pts)					

Complete Grade Designation (30 points)	Factor or Factors (20 points)

Contestant No. _____
 Sample No. _____

Total Score _____

SOYBEANS						
Grade	Minimum Test Weight Per Bushel	Heat-damaged Kernels	Damaged Kernels (Total)	Foreign Material	Splits	Soybeans of Other Colors
Level						
Grade (2pt/e)						
Remarks (2 pts)						

Complete Grade Designation (30 points)	Factor or Factors (20 points)

Contestant No. _____
 Sample No. _____

Total Score _____

WHEAT							
Factor	Minimum Test Weight Per Bushel	Heat-damaged Kernels	Damaged Kernels (Total)	Foreign Material	Shrunken and Broken Kernels	Defects (Total)	Contrasting Classes
Level							
Grade (2pt/e)							
Remarks (2 pts)							

Complete Grade Designation (30 points)	Factor or Factors (20 points)

Pest Management

1. In 2009 the Pest Management section will be comprised of 20 multiple choice questions regarding basic information on pest management, including but not limited to pest identification and pesticide application. This section will be worth 100 points. All questions may not be of equal value.
2. Students may have an electronic calculator and writing utensil.
3. Questions for the pest management examination will come from the *2007 Peanut Production Guide for Oklahoma*. Study materials for pest identification will be posted on the web at www.casnr.com.

PART 3 – Seed Analysis and the General Agronomic Knowledge Exam

Seed Analysis

1. Four samples of crop seed will be analyzed for mixtures of weed seeds and other crops or classes. Each sample will be worth 50 points for a total of 200 points .
2. The contestant must correctly identify the base sample and indicate that crop on the official answer form. Base samples will be selected from the following crops:
Cereals: barley; oat; hard red winter wheat; Durum wheat; hard white wheat; grain sorghum
Large-seeded legumes: soybean
Small-seeded legumes: alfalfa
3. The size of the samples, before the addition of admixtures, will be approximately: cereals - 30 grams (1/4 cup); large-seeded legumes - 65 grams (1/3 cup); small-seeded legumes - 5 grams (1 tablespoon)
4. The contestant must identify, classify, and properly write the names of all admixtures in the base sample. The classification shall be as follows: (a) other crops and/or classes; (b) prohibited noxious weeds; (c) restricted noxious weeds; (d) common weeds. See the official answer form for seed analysis at the end of this section. The base sample and each admixture must be written using correct spelling and proper form according to the identification list.
5. Only crop and weed seeds included on the identification list will be used. Seed used as admixtures must be representative and true to type for that admixture. Only mature seed will be used. At least three seeds of another kind should be found before naming it as an admixture. No more than ten admixtures shall be used in any one base sample.
6. Special regulations on mixtures and naming for seed analysis:
 - **Wheat:** Any pure variety of hard red winter wheat, durum wheat or hard white wheat may be used as a base sample. Hard red winter, soft red winter, or hard red spring wheat will not be found together as an admixture, and hard white wheat and durum wheat will not be found together as an admixture. Any wheat found as an admixture must be named according to market class shown on the identification list.

- Oat: Any pure variety of white or yellow oat may be used as a base sample. Gray, black and hulled oat will not be used as admixtures in oat or other crop samples. White and yellow oats will not be intermixed. Any cultivated oat found as an admixture in other crop samples will be identified only as oat.
- Sorghum: Any pure variety or hybrid grain sorghum may be used as a base sample. Any grain sorghum found as an admixture will be identified as white grain sorghum, tannin grain sorghum, or grain sorghum (yellow, red, pink, or salmon colored pericarps). Tannin grain sorghum and grain sorghum will not be mixed together but each may be used separately in white grain sorghum or in other crops.
- Soybean: Any pure variety of yellow soybean may be used as a base sample. Varietal mixtures will not be used.
- Alfalfa: Any pure sample of alfalfa may be used as a base sample. Sweetclover will not be used as an admixture in alfalfa.

7. **Scoring system**

- The total score for each sample will be 50 points.
- The following points will be allotted for proper classification of each impurity; other crops and/or classes 1; prohibited noxious weeds 3; restricted noxious 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.
- The remaining points will be allotted equally, or approximately so, for proper identification of 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, dropping the remaining fraction.)
- When less than four impurities are present, no more than 12 points (total for classification and identification) will be allotted to each. This allows the maximum deduction of 12 points for any impurity not identified. In a sample with 0-3 impurities, other crops and/or classes = 10 points; prohibited noxious weeds = 12 points; restricted noxious weeds = 11 points and common weeds = 10 points.
- The contestant who names an impurity which is not present will be penalized approximately one-half of the points allocated to the proper identification of an impurity present. If a contestant calls an impurity in a sample which contains none, 12 points will be deducted and two impurities will cause a loss of 24 points, etc.
- Five points will be deducted for the improper identification of the base sample.

GENERAL AGRONOMIC KNOWLEDGE

1. The general agronomic examination will be comprised of 30 multiple choice questions for a total of 150 points to be completed in 40 minutes.
2. Questions will be of general agronomic nature and will come from the designated reference for that year. Topics will include but are not limited to: crop biology and adaptation, planting, nutrient and water requirements, common pests, harvesting and storage. Questions may require calculations.

Questions for the general agronomic knowledge examination will come from the 2007 Peanut Production Guide for Oklahoma. Copies of this publication may be obtained from your county extension educator or by from the internet at:
<http://www.peanut.okstate.edu/prodinfo/index.htm>

3. Examples of questions might be:
 1. The growth habit of alfalfa is:
 - a) summer annual
 - b) winter annual
 - c) perennial
 - d) biennial
 2. The standard test weight per bushel for wheat is:
 - a) 60 lbs.
 - b) 58 lbs.
 - c) 56 lbs.
 - d) 48 lbs.
 3. The flowering date of soybeans is determined by:
 - a) growing degree days
 - b) daylength
 - c) days from planting
 - d) plant population
 4. If your seed purity is 90% and germination is 80%, how many pounds of pure live seed are in a 50 pound bag of corn seed?
 - a) 50 pounds
 - b) 25 pounds
 - c) 48 pounds
 - d) 36 pounds

Resource materials: The following list of additional general resources has been assembled to help you prepare for the event. These are not required and other sources may also be utilized. Specific references for the CDE are given in the respective sections.

	Item	Description
Plant and seed identification	Plant samples	<ul style="list-style-type: none"> ○ Pressed and mounted plant samples in reproductive stage--Available from PaSS*
	Seed samples	<ul style="list-style-type: none"> ○ Clear envelope with teaspoon of seed.-- Available from PaSS* ○ NASCO--http://www.homeschool-nasco.com/prod/Home
	On-line identification	<ul style="list-style-type: none"> ○ New website specifically for Oklahoma Agronomy CDE (still in development so some plants may not have complete sets of photos posted): http://teachplants.okstate.edu ○ Noble Foundation http://www.noble.org/imagegallery/index.html
	Reference Books	<ul style="list-style-type: none"> ○ Weeds of Nebraska ○ Field Guide to Oklahoma Plants ○ Weeds of the North Central United States
Grain grading	Grain grading sets	<ul style="list-style-type: none"> ○ Set of 6 grain grading cards from previous contests—Available from PaSS
	Grain grading damages fact sheets	<ul style="list-style-type: none"> ○ Wheat Kernel Damage –Available from PaSS. ○ Soybean Kernel Damage –Available from PaSS. ○ Corn Kernel Damage –Available from PaSS. ○ Sorghum Kernel Damage –Available from PaSS. ○ Stored Product Management, Fact Sheet No. E-912
	Official US grain standards	<ul style="list-style-type: none"> ○ http://www.gipsa.usda.gov/GIPSA/webapp?area=home&subject=grpi&topic=sq-ous
	Grain grading handbook	<ul style="list-style-type: none"> ○ Kansas State Univ. Agronomy Dept. 785-532-5776
Seed analysis	Seed analysis sets	<ul style="list-style-type: none"> ○ Available from PaSS. Set of 5 seed analysis sets from previous contests
Pest management	Handbook	<ul style="list-style-type: none"> ○ 2002 OSU Extension Agents' Handbook of Insect, Plant Disease and Weed Control, Fact Sheet No. E-832 ○ Soil, Plant and Crop Science CIMC-Section D4 ○ Weed Control in Agronomic Crops—Fact Sheet No. 2751
Nutrient management		<ul style="list-style-type: none"> ○ Homeowner's Handbook for Soil and Nutrient Management ○ Oklahoma Soil Fertility Handbook http://fp.okstate.edu/zhailin/Extn_Pub/SFHB2006C.pdf
Forage evaluation		<ul style="list-style-type: none"> ○ Understanding Forage Quality—American Farm Bureau 1-01. Available from PaSS.
General agronomic knowledge		<ul style="list-style-type: none"> ○ OSU Wheat Management Guide E-831 ○ OSU Alfalfa Production Guide E-826 ○ OSU Soybean Production Guide E-967 ○ OSU Canola Production Guide http://www.canola.okstate.edu/ptguides/index.htm ○ OSU Cotton Production and Pest Management E-883 ○ OSU Peanut Production Guide for Oklahoma E-806 http://www.peanut.okstate.edu/prodinfo/index.htm ○ OSU Production of Winter Hardy Canola in Oklahoma F-2130
		○

*Contest coordinator in OSU Department Plant and Soil Sciences. See order form at end of Rules and Regulations.

Hard copies of extension references may be ordered by directly contacting your county extension educator or by contacting Oklahoma State University Mailing Services at 405-744-5385.

APPENDIX A

EXPLANATION OF GRAIN GRADING

Grain is graded for marketing purposes according to a set of requirements, established by the U.S. Department of Agriculture's Federal Grain Inspection Service (FGIS), called the Official U.S. Standards for Grain. The purpose of grading grain is to assign a label to it, known as the grade designation, which indicates its quality and determines its market value. Following is an explanation of the grading standards for wheat, sorghum, corn, and soybeans in a simplified form, taken from the U.S. Grain Standards for these crops.

Grades: Samples of grain are placed in numerical grades, ranging from U.S. No. 1 to U.S. No. 5, or Sample Grade, depending on quality. Certain factors or quality characteristics must be measured for each sample of grain, and the degree of quality of each factor is compared to the values listed in the grade requirements chart. The numerical grade for each factor on the table must be properly recorded.

Numerical Grading Factors: The numerical grading factors are the quality characteristics that determine the grade number assigned to a sample of grain. They are the column headings on the grade requirement charts, and most of them apply to all of the grains to be graded, although the limits may differ from one grain to another. The grade assigned to a sample is always based on the most serious factor or factors.

Test Weight Per Bushel: Test weight is the weight in pounds of an exact bushel volume of grain. Usually a one quart container is filled and weighed, with the weight converted to pounds per bushel. A bushel of dry, clean, plump grain will weigh more than an equal quantity of grain which is shriveled, hollowed out by insects, or high in moisture. Thus, a high test weight indicates good quality and a high numerical grade, while low test weight places the sample in a lower grade.

Damaged Kernels: Damaged kernels are those which for some reason may be considered unfit for food or feed purposes. There are many types of grain damage, but we will be concerned primarily with those included in the identification list (heat, sprout, mold, and insect damage). Of these, **Heat-damaged kernels** are considered especially serious, and are handled as a separate factor in each of the grade requirements charts. The other kinds of damage are grouped together, and along with heat damage, are classified as total damage. Therefore, heat damage must be considered by itself, then added to any other kind of damage present, and considered as part of the numerical grading factor for **Damaged Kernels (Total)**. Other colors or market classes of the grain being graded which are damaged must also be included in Damaged Kernels (Total). In grading of corn, only damaged kernels of corn, and in soybeans, only damaged kernels of soybeans, are included as damaged kernels. However, in grading of wheat or sorghum, any of the kinds of damaged kernels of other grains on the identification list are included as part of the numerical factor for either Heat-damaged Kernels or Damaged Kernels (Total). For example, in grading corn, sprout-damaged wheat in the sample does not count as damaged kernels, but in grading sorghum, sprout-damaged wheat is included as damaged kernels, either by itself or added to any damaged sorghum present. (The wheat is also considered as foreign material in either case). Heat-damaged Kernels are those which are distinctly black or brown due to high temperatures which build up in "hot spots" in damp grain stored for long periods. Sprout-damaged kernels are those which germinate on the plant during very wet conditions which delay harvest and which dry out later killing the germ. Kernels on which mold or other diseases have been growing are also considered as damaged kernels. Kernels are considered insect-damaged if the insect has eaten a tunnel, hold, or cavity which is not fully exposed.

Foreign Material/Broken Corn and Foreign Material/Broken Kernels and Foreign Material: Foreign material includes all matter in the sample except the kind of grain which is being graded. Fine material, dirt, small pieces of broken grain, pieces of stems, hulls, weed seeds, and any other grains are all considered foreign material. Some of these may be separated by mechanical screening or sieving. Each crop differs slightly in the way foreign material and broken kernels are separated and defined. In **soybeans**, the factor **Foreign Material** consists of fine material screened out which is given as a card factor plus any visual foreign material (other crops, weed seed, etc.) shown on the grading card. In **wheat**, the factor **Foreign Material** consists only of visual factors, since the fine material is removed as dockage. In **corn**, the factor **Broken Corn and Foreign Material** consists of broken corn and fine foreign material screened out which will be given as card factors plus any visual foreign material shown on the card. In **sorghum**, there are two factors of concern. The factor **Foreign Material** includes coarse foreign material screened out which will be given as a card factor plus any visual foreign material shown on the card. The factor **Broken Kernels and Foreign Material** also includes a fine broken kernels portion screened out which will also be given as a card factor. In wheat and sorghum, visual demonstrations of other grains which are damaged are counted both as Foreign Material and Damaged Kernels (Total).

Shrunken and Broken Kernels in wheat is used as a numerical factor. This is determined by sieving, and is given as a card factor on every sample of wheat.

Defects (Total), as a numerical factor in wheat, is the sum of the Damaged Kernels (Total), Foreign Material, and Shrunken and Broken Kernels added together. It should be noted that the limits for Defects (Total) in the grade requirements for wheat are the same as for Shrunken and Broken Kernels. Thus, if the percent of Shrunken and Broken Kernels alone determines the numerical grade, Defects (Total) must also be listed as a determining factor. Heat-damaged kernels are a part of Defects (Total), but do not need to be added again since they should already have been included as a part of the Damaged Kernels (Total).

Contrasting Classes in wheat refers to the presence of Durum Wheat or Hard White Wheat or Soft White Wheat in Hard Red Winter Wheat, which would reduce the quality of a sample of Hard Red Winter Wheat for bread making. A sample cannot be graded lower than U.S. No. 4 because of Contrasting Classes. If it contains more than 10% Contrasting Classes, the sample is classified as Mixed Wheat, and then it is regarded with the factor Contrasting Classes disregarded.

Splits in soybeans are broken pieces of soybeans in the sample that are not otherwise damaged (i.e. mold, insect, etc.) They are considered objectionable and lower the grade of the sample because the oil in the broken pieces is oxidized, reducing the quality of the soybean oil when extracted. They will be shown as one of the visual factors. If split kernels are, in fact, also damaged in some other way, they must be considered as Damaged Kernels (Total) instead of Splits.

Soybeans of Other Colors refers to Brown or Black Soybeans in a sample of Yellow Soybeans. This factor will be demonstrated as a visual factor or may be given as a card factor for Black or Brown Soybeans. A sample cannot be graded lower than U.S. No. 4 because of Soybeans of Other Colors. If it contains more than 10% Soybeans of Other Colors, the sample is classified as Mixed Soybeans, and it is then regarded with the factor Soybeans of Other Colors disregarded. (Note: brown soybeans and black soybeans are not on the identification list, but may still appear in the grain grading section.)

SAMPLE GRADE FACTORS

Whenever any of the numerical grading factors on the grade requirements chart exceeds the limits of the lowest grade, except Contrasting Classes in wheat or Soybeans of Other Colors in soybeans, the sample must be placed in Sample Grade. Other factors which would cause a sample to be Sample Grade are discussed below. The descriptions and limitations for sample grade factors are given the paragraph immediately below the numerical chart in the standards for each crop. Since most of these determinations are made on large portions of the grain or in the elevator, boxcar or barge (i.e. odors, heating, etc.) when the sample is first collected, they will all be given as card factors for the contest. Grain which is Sample Grade is generally considered to be unfit for human food or commercial use. If these non-numerical factors are grade-determining, they must be recorded in the remarks section.

Stones: The presence of 8 or more stones in a 1000-gram sample of any of the grains (4 or more for wheat) places it in Sample Grade. Weight limits also apply for some crops, but will be ignored for the contest. The number of stones per 1000 gram sample will be given as a card factor. Since most grain sold by grade is ground up for food or feed, the presence of stones would be damaging to the processing machinery, and objectionable when found in food products.

Castorbeans, Cockleburs, Crotalaria, Broken Glass, Animal Filth: The presence of any of these materials in a sample of grain is undesirable for either human food or animal feed. Castorbeans and crotalaria are poisonous seeds, broken glass is dangerous, and animal filth is highly objectionable. They are listed specifically as Sample Grade factors in the grading standards charts with appropriate limits per 1000 gram sample. For the contest, they will always be given as card factors with amounts per 1000 grams indicated.

Harmful or Toxic Foreign Substance: This refers mainly to poison-treated seed grain. The chemical mixture applied to seeds for planting to prevent seedling diseases is usually colored a bright pink, purple or green. Its presence causes grains to be graded as Sample Grade because of distinctly low quality. Farmers must be extremely careful to prevent mixing of any left-over treated seed with grain that they feed, and particularly with the grain they sell. If any poison-treated kernels are found, the entire lot (truckload, railroad car or bin full) may be seized by the Federal Food and Drug Administration, and condemned for any feed or food use.

Musty, Sour, or Heating: Each of these terms, which will be given as a card factor, indicates that the grain is in the process of spoiling, and is not in good condition. If present, they should be listed as determining factors for Sample Grade on the right-handed side of the grain grading answer sheet.

Commercially Objectionable Foreign Odors: This term includes any strong odor which the grain may pick up, which stays in it throughout processing, and which remains in the finished product, such as flour or cornmeal, baked goods or soybean oil. The kind of odors which we will include in our grading, all of which will be given as card factors, are smoke odor, skunk odor, oil, gasoline, diesel, or kerosene odor, and dead animal odor (due to tankage, meat scraps, raw hides or dead rodents in the grain). Many of these odors are picked up by storing grain in the sample buildings with these odor-producing materials, or in bins, trucks, or box cars contaminated with them. It should be noted that odors of smut or garlic are not considered to be commercially objectionable.

SPECIAL GRADE FACTORS

Special grades are quality determinations made after the numerical grade has been determined. They indicate some quality feature of the grain which is not included in the grading chart (i.e. Infested, Garlicky, Smutty). When a special grade applies, the proper term for each grain is added to the grade designation, following the class and kind of grain on the left-handed side of the answer sheet. The quantities or reasons which cause the use of a special grade are never listed as a grading factor on the

right-hand side of the answer form (factors included on the right are only those determining the numerical grade). All factors for determining special grades will be stated as card factors, and any evidence which might be found in the master sample must be ignored. Special grades need not be recorded in the remarks section, but must appear with the lot designation.

MARKET CLASSES OF GRAIN

When sold for commercial purposes, each kind of grain is divided into market classes, which indicate the kind of use each sample is best suited for. Classes of corn, sorghum and soybeans are based on color. In wheat, classes are based on differences in texture (hardness) and protein content. The texture of wheat is determined mainly by the weather and varieties grown, which vary a great deal in different parts of the United States. The cool climate and high rainfall of the Pacific Northwest and of the Northeastern states is best suited to growing Soft White Wheat, which is very low in protein, and is used for crackers, pastries, noodles and breakfast cereals. In Oklahoma and the surrounding states in the Southern Great Plains, we grow Hard Red Winter Wheat, which usually has enough protein for good bread-making. Newly developed Hard White Wheat varieties suitable for bread making are being grown in California and in the Great Plains and may become as popular as Hard Red Winter Wheat in the. Hard Red Spring Wheat is grown in the Northern Great Plains (the Dakotas and Canada) where the dry summers cause the wheat to be high in protein, and ideal for bread-making. Durum Wheat is also grown in the Northern Great Plains and is very hard which makes very good macaroni, spaghetti and noodles. Its protein content is very high, but it is not of suitable quality for making bread. The Eastern states, which have plenty of rainfall, produce Soft Red Winter Wheat, which has a low protein content, and is best suited for cookies and cakes. We will grade only samples of Oklahoma-grown Hard Red Winter Wheat, and need to consider only hard White Wheat, Soft White Wheat and Durum Wheat for the grading factor "Contrasting Classes" and the possibility that it may be classified as Mixed Wheat. Although Soft Red Winter and Hard Red Spring mixtures in the Hard Red Winter Wheat may also affect the grade and class, they are difficult to distinguish from one another and will not be used in the grading portion of our contest. Market class need not be recorded in remarks section, but must appear as part of the lot designation.

Classes of corn:

- **Yellow Corn:** Kernels yellow or yellow with reddish areas, containing not more than five percent of white, red, or other-colored kernels.
- **White Corn:** Kernels white or white with pink or yellow tinges with not more than two percent of yellow or other colors.
- **Mixed Corn:** Any sample that does not meet the requirements for the classes Yellow Corn or White Corn.

Classes of sorghum:

- **Sorghum:** Sorghum with white subcoats and yellow, yellow-red, orange-red, salmon-pink, reddish or white pericarps, or white pericarps with black or reddish spots, with not more than three percent of tannin sorghum. White kernels are allowed in any amount in yellow sorghum and do not cause mixed sorghum.
- **Tannin Sorghum:** Sorghum with brown subcoats caused by the presence of tannin with not more than ten percent of sorghum of other colors. Tannin sorghums are identified by the presence of brown subcoats beneath the pericarps and may have pericarps of other colors. However, tannin sorghum used in the contest will have only brown or tan pericarps so they can be distinguished from non-tannin sorghum with reddish pericarps.

- **White Sorghum:** Sorghum with white pericarps with not more than two percent of sorghum of other colors. White sorghum with more than two percent sorghum (yellow, red, orange or salmon pericarps) and less than three percent tannin sorghum is classified as "Sorghum". White kernels may have black, brown, or reddish spots which cover not more than 25% of the kernel.
- **Mixed Sorghum:** Sorghum and/or white sorghum with more than three percent tannin sorghum or tannin sorghum with more than ten percent of other colors.

Classes of soybeans:

- **Yellow Soybeans:** Soybeans with yellow or greenish seed coats with not more than ten percent soybeans of other colors (black and/or brown soybeans).
- **Mixed Soybeans:** Soybeans with more than ten percent soybeans of other colors (black and/or brown soybeans). (Note: Brown Soybeans and Black Soybeans have been removed from the identification list, but may still appear in the grain grading section.)

Classes of wheat:

- **Hard Red Winter Wheat:** Hard Red Winter Wheat with not more than ten percent wheat of Contrasting Classes (Durum and/or Hard or Soft White Wheat).
- **Mixed Wheat:** Hard Red Winter Wheat with more than ten percent Contrasting Classes (Durum and/or Hard or Soft White Wheat). Mixtures of Hard Red Spring and/or Soft Red Winter Wheat at more than ten percent will also cause mixed wheat, however these will not be used in the contest due to the difficulty of distinguishing them, especially if damaged.

Determination of mixtures of classes: The classes (colors) of corn, soybeans and sorghum not matching the master sample, and of Contrasting Classes (Hard and Soft White Wheat and Durum Wheat) in Hard Red Winter Wheat, may be shown as visual factors on the grading cards. Representative market classes for corn, soybeans, sorghum and wheat are included on the ID list. Other classes may also be given as a card factor. Visual class factors such as heat-damaged or mold-damaged kernels in which the color or class is not distinct and easily determined should be considered as the same class as the master sample, and not included as mixed. Definitions of market classes will be provided to contestants with the grade requirement tables.

WRITING THE GRADE DESIGNATION and DETERMINING FACTORS and RECORDING GRADE DETERMINING FACTORS

In order to get full credit, the grade designation must be correctly written. It consists of two parts: the grade designation itself and the determining factors. Additionally, the grade determining factors as recorded on your official worksheet will be scored. See the examples written on an official answer form, which go with the practice problems at the end of this section.

The Grade Designation is written as follows on the left-hand side:

1. The numerical grade preceded by the abbreviations "U.S. No." or "U.S. Sample Grade" --whichever applies.
2. The name of the class and kind of grain (such as "Hard Red Winter Wheat", "White Sorghum" or "Mixed Corn").
3. The Special Grade terms which apply (such as "Infested" or "Smutty"), following a comma after the name of the kind of grain.

The Grade-determining Factor or Factors are written on the right-hand side:

1. The column headings in the grade requirement charts such as "Test Weight Per Bushel", "Damaged Kernels (Total)", or "Defects (Total)" which cause the sample to be placed in the numerical (or sample) grade listed on the left.
2. Factors causing the grain to be graded Sample Grade if appropriate, such as "Musty", "Sour", "Heating", "Animal Filth", or "Commercially Objectionable Foreign Odor", "Glass", "Stones", "Crotalaria", "Castorbeans", "Cocklebur", "Toxic Foreign Substance", "Low Quality"
3. All factors which determine the grade chosen should be listed. No factors are given for a sample grading U.S. No. 1. The maximum number of determining factors will be four. Percentages (or lbs for Test Weight Per Bushel) should be stated for each factor in parentheses immediately following. For examples of correctly written grade designations, see the completed official grain grading form which follows the examples.

The Grade-determining and Class-determining factors are written on the official worksheet

1. All numerical grade-determining factors are recorded on the official worksheet at the bottom of each column. Either the numerical designation is given or the words "Sample Grade" are written. SG will be acceptable.
2. All non-numerical Grade-determining factors are written in the "Remarks" section of the worksheet.
3. All non-table factors which alter the class are also recorded in the remarks section.

1. **Sample of Hard Red Winter Wheat.**

Card Factors

Test Weight Per Bushel	62.5 lbs.
3 garlic bulblets in 1000 grams	
3 stones in 1000 grams	
Shrunken and Broken Kernels	6.0%
Odor of Smut	

Visual Factors

Heat-damaged HRW wheat	1.0%
Sprout-damaged HRW wheat	1.5%
Mold-damaged soybeans	1.2%
Undamaged Durum Wheat	5.0%

Note: Four or more stones are required for Sample Grade; Damaged Kernels (Total) (including other grains), Foreign Material, and Shrunken and Broken Kernels must be added together to obtain Defects (Total); Mold-damaged soybeans must be added to Sprout-damaged and Heat-damaged wheat to obtain Damaged Kernels (Total), and added again as Foreign Material; 3 garlic bulblets causes special grade "Garlicky"; odor of smut causes special grade "Light Smutty."

Contestant No. _____

Sample No. 1

Total Score _____

WHEAT							
Factor	Minimum Test Weight Per Bushel	Heat-damaged Kernels	Damaged Kernels (Total)	Foreign Material	Shrunken and Broken Kernels	Defects (Total)	Contrasting Classes
Level	62.5	1.0 →	1.0 1.5 1.2 →	1.2	6.0		5.0
		<hr/> 1.0	<hr/> 3.7 +	<hr/> 1.2 +	<hr/> 6.0 =	<hr/> 10.9	
Grade (2pt/e)	1	4	2	3	3	4	4
Remarks (2 pts)	Garlicky* Light smutty*						

Complete Grade Designation	Factor or Factors
U.S. No. 4 Hard Red Winter Wheat, Garlicky, Light Smutty	Heat-damaged kernels (1.0%) Defects (Total) (10.9%) Contrasting Classes (5.0%)

* These remarks are not required to be given, as these indicate a *special* grade,

not a numerical grade or class change. They may be recorded here without penalty.

3. **Sample of Sorghum.**

Card Factors

Test Weight Per Bushel	55.0 lbs.
Dead insect bodies	
Kernels covered with smut spores	
Foreign Material sieved out	1.0%
Broken Kernels sieved out	4.5%

Visual Factors

Insect-damaged sorghum	7.0%
Sprout-damaged wheat	1.5%
Giant ragweed seed	1.0%
Undamaged white sorghum	11.0%
Undamaged tannin sorghum	2.5%

Note: Damaged wheat must be added to damaged sorghum for Damaged Kernels (Total); wheat and giant ragweed must be added to foreign material sieved out to get Foreign Material, which is then added to broken kernels sieved out to get Broken Kernels and Foreign Material; presence of smut spores causes special grade "Smutty"; 2.5% tannin sorghum in sorghum is not enough to cause class Mixed; any amount of white kernels are allowed in sorghum, thus class remains "Sorghum"; insects must be live to cause Infested special grade.

Contestant No. _____

Sample No. 3

Total Score _____

SORGHUM					
Grade Level	Minimum Test Weight Per Bushel	Heat-damaged Kernels	Damaged Kernels (Total)	Foreign Material	Broken Kernels and Foreign Material
	55.0		7.0 1.5	1.0 1.5 1.0	1.0 4.5 1.5 1.0
		<hr/> 0.0	<hr/> 8.5	<hr/> 3.5	<hr/> 8.0
Grade (2pt/e)	2	1	3	3	3
Remarks (2 pts)	Smutty*		<u>Other colors</u> *		
			<u>2.5</u> – tan		

Complete Grade Designation	Factor or Factors
U.S. No. 3 Sorghum, Smutty	Damaged Kernels (Total) (8.5%) Foreign Material (3.5%) Broken Kernels and Foreign Material (8.0%)

* remarks not required as does not change numerical grade or class.

4. **Sample Yellow Soybeans**

Card Factors

Test Weight Per Bushel 51.0 lbs.
 Odor of garlic
 Foreign Material sieved out 2.0%
 9 mouse pellets per 1000 grams

Visual Factors

Mold-damaged yellow soybeans 2.5%
 Heat-damaged corn 1.5%
 Undamaged black soybeans 10.9%

Note: Damaged corn is not included as damaged kernels in soybeans; the corn is Foreign Material and must be added to sieved Foreign Material; the black soybeans are Soybeans of Other Colors, but exceed 10% making class "Mixed", thus Soybeans of Other Colors column is disregarded; strong garlic smell does not cause special grade "Garlicky", there must be garlic bulblets; 10 pieces of animal filth are needed to make Sample Grade.

Contestant No. _____

Sample No. 4


Total Score _____

SOYBEANS						
Grade	Minimum Test Weight Per Bushel	Heat-damaged Kernels	Damaged Kernels (Total)	Foreign Material	Splits	Soybeans of Other Colors
Level	51.0		2.5	2.0 1.5		10.9
		<hr/> 0.0	<hr/> 2.5	<hr/> 3.5	<hr/> 0.0	<hr/> 10.9
Grade (2pt/e)	4	1	2	4	1	Mixed
Remarks						
(2 pts)						

Complete Grade Designation	Factor or Factors
U.S. No. 4 Mixed Soybeans	Minimum Test Weight per Bushel (51.0 lbs.) Foreign Material (3.5%)

APPENDIX B

Pre-Registration Form 2009

School:	 <p>Presented by: Oklahoma State University Plant and Soil Science Department and the OSU Crops Judging Team</p>
Address:	
Phone:	
Advisor:	
Team:	
Individuals:	

ORDER FORM FOR CROPS JUDGING TEACHING MATERIAL
Deadline to order for 2009 Agronomy CDE: February 28, 2009*

 Teacher's name

 Date Received (official use only)

 School or Organization

 Address

 Received By (official use only)

 City, State, Zip

 Type of Payment

 Ordered By

 Purchase Order No. (if available)

ITEMS	INDIVIDUAL COST	NUMBER OF ITEMS	TOTAL COST
PLANTS			
Complete Set – Mounted	\$50.00		
Individual Plants	\$5.00		
SEEDS			
Complete Set	\$50.00		
Individual Seeds	\$5.00		
MISCELLANEOUS			
Seed Analysis Practice Samples	\$25.00		
Grain Grading Practice Samples	\$25.00		
CONTEST KITS			
Crops Judging Contest Kit--to be used for District Contests	\$150.00		
TOTAL COST OF ORDER			

Send order to:

Department of Plant and Soil Sciences
 368 Ag Hall
 Oklahoma State University
 Stillwater, OK 74078

Or Call:

405-744-6130

*Because of limited supplies orders received after February 28th may not be filled