4-H/FFA Crops Evaluation CDE
Indiana Agronomy Skills Development

Contest Coordinator Booklet

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GENERAL RULES

1. The outline of the event and all rules included herein are official for the Area and State events.

2. There will be two levels of participation:
   a. Junior- participates at the middle school or Jr. high level
   b. Senior- participates at the high school level

3. The following sections will be included in the contest and will include the following point values:

   **Section I: Identification (600 points)**
   - 25 weed and crop plant samples (250 points)
   - 25 weed and crop seed samples (250 points)
   - 10 crop disease, damages, and harmful insects (100 points)

   **Section II: Grain Grading (200 points)**
   - 4 corn samples (100 points)
   - 2 soybean samples (50 points)
   - 2 wheat samples (50 points)

   **Section III: Agronomy Exam (200 points)**
   - 40 multiple choice questions

   Total for Contest: 1000 points

4. Ties will be broken in the following order: Section I, Section II, Section III

5. A maximum of 60 minutes will be allowed for each section of the event. Twenty minutes will be allowed for each part of Section I.

6. Participants *are required to use clipboards* while participating in the event and should supply their own No. 2 pencils and non-scientific calculators. Students may also use a magnifying glass during the identification section and a *Corn and Soybean Field Guide during the agronomy exam.*

7. **THERE WILL BE NO COMMUNICATION WITH OTHER PARTICIPANTS OR ANYONE ELSE BUT THE OFFICIALS. CELLULAR DEVICES ARE NOT PERMITTED AT ANY TIME DURING THE CONTEST.**
IDENTIFICATION

What is identification?
- Participants will identify the following during this portion of the contest:
  - Common crop plants and seeds grown in Indiana
  - Common weed plants and seeds that are problematic in crop systems in Indiana
  - Common disease and damages found in corn, soybeans, or cereal grains such as wheat and rye
  - Common insects that are problematic in Indiana crop systems

What do participants need to provide?
- Participants will need the following tools for this portion of the contest:
  - Clipboard
  - Pencil(s)
  - Magnifying glass (optional)

What are participants provided with by contest officials?
- Answer sheets that have a complete list of plants, seeds, diseases, damages, and insects included.

Rules for this portion of the contest
- This portion of the contest is split into 3 separate areas:
  - 25 Plant Specimens (250 points)
  - 25 Seed Specimens (250 points)
  - 10 Disease/Damages and Insects (100 points)

- Participants will have 20 minutes per section. (total time: 60 minutes)

- Each specimen is worth 10 points, making this section worth 600 points of the total contest.

- Not all specimens will be used in the contest and some specimens may be repeated. Crops and weeds will not be separated in the contest.

Some specimens must have specific details provided to participants if they are used in a contest.
Identification Set Up

Seed Samples
- All samples must be presented as actual seed samples. If these cannot be used, then a clear, adequate picture may be used instead. Samples used must correlate with the description given of the seed (see References).
- 25 weed and crop samples will be presented
- Weed and crop samples will not be separated
- Samples may be repeated
- Specific instructions for some specimens if used in the contest:
  - Canola- a picture of the seed coat ridges or text stating “hilum has 3 ridges”
  - Wild mustard- a picture of the seed coat ridges or text stating “hilum has 3 ridges”
  - Foxtails
    - Samples must contain the following text with the seed sample
      - Giant foxtail- has lemma and palea attached
      - Green foxtail- has palea covering ½ the seed

Plant Samples
- All samples must be presented as plant mounts OR live samples. If these cannot be used, then a clear, adequate picture may be used instead. Samples used must correlate with the description given of the plant (see References).
- 25 weed and crop samples will be presented
- Weed and crop samples will not be separated
- Samples may be repeated
- Specific instructions for some specimens if used in the contest:
  - Garlic mustard- this plant cannot be used until the 2012 contest season
  - Foxtails- Yellow foxtail cannot be used until the 2012 contest season.
    - If the plant sample does not show the hair distribution clearly, then the following information must be provided as either text or a clear picture with the sample:
      - Green foxtail- the upper leaf surface contains no hairs
      - Giant foxtail- the upper leaf surface contains short hairs
      - Yellow foxtail- the upper leaf surface contains long, sparse hairs
Insect, Disease, and Damage Samples
- All samples must be presented as photographs or specimens. Samples used must correlate with the description given of the insect, disease, or damage (see References).
- 10 insect, disease, and damage samples will be presented
- Samples may be repeated

The next 3 pages outline the samples that may be used in the identification portion of the contest.
# Seed, Plant, Disease, Damage, and Insect Lists for 2011-2015

## Crop Plants
- alfalfa
- alsike clover
- barley
- birdsfoot trefoil
- canola
- corn
- crownvetch
- grain sorghum
- hairy vetch
- Kentucky bluegrass
- Korean lespedeza
- oat
- orchardgrass
- red clover
- reed canarygrass
- rye
- ryegrass
- smooth bromegrass
- soybean
- sudangrass
- sweetclover
- tall fescue
- timothy
- wheat
- white clover

## Weed Plants
- barnyardgrass
- buckhorn plantain
- burcucumber
- Canada thistle
- common cocklebur
- common lambsquarters
- common ragweed
- curly dock
- dandelion
- downy brome
- Eastern black nightshade
- fall panicum
- field bindweed
- field pennycress
- field pepperweed
- garlic mustard
- giant foxtail
- giant ragweed
- green foxtail
- hedge bindweed
- hemp dogbane
- horse nettle
- horseweed
- ivyleaf morningglory
- jimsonweed
- johnsongrass
- large crabgrass
- oxeye daisy
- Pennsylvania smartweed
- perennial sowthistle
- quackgrass
- redroot pigweed
- shepherdspurse
- tall morningglory
- trumpet creeper
- velvetleaf
- wild buckwheat
- wild carrot
- wild garlic
- wild mustard
- yellow foxtail
- yellow nutsedge
Crop Seeds
alfalfa
alsike clover
barley
birdsfoot trefoil
canola
dent corn
sweet corn
popcorn
crowntvet
flax
grain sorghum
hairy vetch
Kentucky bluegrass
Korean lespedeza
oat
orchardgrass
red clover
reed canarygrass
rice
rye
ryegrass
smooth bromegrass
soybean
sudangrass
sweetclover
tall fescue
timothy
triticale
durum wheat
hard red winter wheat
soft red winter wheat
white wheat
white clover

Weed Seeds
barnyardgrass
bindweed
buckhorn plantain
burcucumber
Canada thistle
common cocklebur
common lambsquarters
common milkweed
common ragweed
curly dock
dandelion
downy brome
Eastern black
nightshade
fall panicum
field pennycress
field pepperweed
giant foxtail
giant ragweed
green foxtail
hedge bindweed
hemp dogbane
horsenettle
horseweed
jimsonweed
johnsongrass
large crabgrass
morniingglory
oxeye daisy
Pennsylvania
smartweed
perennial sowthistle
quackgrass
redroot pigweed
shepherdspurse
trumpet creeper
velvetleaf
wild buckwheat
wild carrot
wild garlic
wild mustard
# Seed, Plant, Disease, Damage, and Insect Lists for 2011-2015

<table>
<thead>
<tr>
<th>Disease or damage</th>
<th>Crop</th>
<th>Type of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>blacktip</td>
<td>wheat</td>
<td>grain sample</td>
</tr>
<tr>
<td>blue eye mold</td>
<td>corn</td>
<td>grain sample</td>
</tr>
<tr>
<td>ergot</td>
<td>cereal grains</td>
<td>grain sample</td>
</tr>
<tr>
<td>green damage</td>
<td>soybean</td>
<td>grain sample</td>
</tr>
<tr>
<td>heat damage</td>
<td>all</td>
<td>grain sample</td>
</tr>
<tr>
<td>insect damage</td>
<td>all</td>
<td>grain sample</td>
</tr>
<tr>
<td>purple seed stain</td>
<td>soybean</td>
<td>grain sample</td>
</tr>
<tr>
<td>smut</td>
<td>wheat</td>
<td>grain sample</td>
</tr>
<tr>
<td>sprout damage</td>
<td>all</td>
<td>grain sample</td>
</tr>
<tr>
<td>wheat scab</td>
<td>wheat</td>
<td>grain sample</td>
</tr>
<tr>
<td>sound</td>
<td>all</td>
<td>grain sample</td>
</tr>
<tr>
<td>nitrogen deficiency</td>
<td>corn</td>
<td>photo</td>
</tr>
<tr>
<td>phosphorus deficiency</td>
<td>corn</td>
<td>photo</td>
</tr>
<tr>
<td>potassium deficiency</td>
<td>corn</td>
<td>photo</td>
</tr>
<tr>
<td>manganese deficiency</td>
<td>soybean</td>
<td>photo</td>
</tr>
<tr>
<td>gray leaf spot</td>
<td>corn</td>
<td>photo</td>
</tr>
<tr>
<td>northern corn leaf blight</td>
<td>corn</td>
<td>photo</td>
</tr>
<tr>
<td>white mold</td>
<td>soybean</td>
<td>photo</td>
</tr>
<tr>
<td>brown spot</td>
<td>soybean</td>
<td>photo</td>
</tr>
<tr>
<td>sudden death</td>
<td>soybean</td>
<td>photo</td>
</tr>
<tr>
<td>syndrome</td>
<td></td>
<td></td>
</tr>
<tr>
<td>brown stem rot</td>
<td>soybean</td>
<td>photo</td>
</tr>
<tr>
<td>common rust</td>
<td>corn</td>
<td>photo</td>
</tr>
</tbody>
</table>

## Insects

<table>
<thead>
<tr>
<th>Insect</th>
<th>Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>army worm</td>
<td>adult</td>
</tr>
<tr>
<td>Japanese beetle</td>
<td>grub and adult</td>
</tr>
<tr>
<td>soybean aphid</td>
<td>adult</td>
</tr>
<tr>
<td>Western corn rootworm</td>
<td>larvae and adult</td>
</tr>
<tr>
<td>wireworms</td>
<td>adult</td>
</tr>
</tbody>
</table>
Identification-Scoring

- **Plant Identification**
  - Total: 250 points
  - Each specimen is worth 10 points
  - Participants will write the correlating number to the correct specimen. Incorrect number correlation results in a wrong answer and a subtraction of 10 points.

- **Seed Identification**
  - Total: 250 points
  - Each specimen is worth 10 points
  - Participants will write the correlating number to the correct specimen. Incorrect number correlation results in a wrong answer and a subtraction of 10 points.

- **Insect, Damage, and Disease Identification**
  - Total: 100 points
  - Each specimen is worth 10 points
  - Participants will write the correlating number to the correct specimen. Incorrect number correlation results in a wrong answer and a subtraction of 10 points.
What is grain grading?
• Contestants will be given 8 written scenarios of possible grain samples to be graded according to USDA standards. These descriptions will give grain type, weight, moisture, damages, foreign material, and other important information that is normally considered for the grain grading procedure.

What do contestants need to provide?
• Contestants will need the following tools for this portion of the contest:
  o Clipboard
  o Pencil(s)
  o A non-scientific calculator

What are contestants provided with by contest officials?
• Grain grading problems
• Official grain grading answer sheet
• Juniors contestants: Grain grading handbook

Rules for this portion of the contest
• This portion of the contest will have the following 8 grain samples:
  o 4 Corn samples
  o 2 Soybean samples
  o 2 Wheat samples

• Contestants will have 60 minutes to complete all 8 samples.

• Each sample is worth 25 points.

• Contestants will grade samples based on the official standards. This set of standards will be provided to junior contestants to use during this portion of the contest. Senior contestants are not permitted a copy of the standards during the contest at any time.
Grain Grading Set-up

Problem Set
- Problem sets can be provided by the Purdue Collegiate Crops Judging Team by calling (765)-494-4773.

- If writing a problem set, please refer to the grain grading section of the “2011-2015 4-H/FFA Crops Evaluation CDE: Indiana Agronomy Skills Development” for rules and regulations.

- When making the key for problem sets
  - the year and contest should be clearly marked at the top
  - All required answers on the answer sheet should be bolded, underlined, or have an asterisk mark

What to provide participants
- Problem set
- Answer sheet
- Charts
- Grain grading booklet (Juniors only)
Grain Grading-Scoring

- *The Official Grain Standards of the United States*, published by the U.S. Department of Agriculture, Federal Grain Inspection Service, will be the official manual for completing the answer sheet which resembles an official grain grading certificate. If, however, the rules of the grading change during the five year coverage of this document, the rules spelled out within will have presidency.

- Some customers request that information in addition to grading factors be recorded on the grain certificate. If extra information (other than factors which affect grade) is recorded on the answer sheet, the information MUST be correct. **If the additional information is not correct, then 1 point is deducted for each incorrect factor box.**
  - Example: If a participant incorrectly records Damage Kernels (Total) Information and that information is not a grading factor, the participant would lose 1 of their 12 points possible for that line. See examples of correctly written grades.

- Incorrectly written percentages will result in an incorrect answer.
  - Numbers less than 1 should be written to include a zero before the decimal
    - Ex. .8% should be recorded at 0.8%

- Extraneous marks, such as zeros or dashes, put in factor boxes will be counted as wrong answers. This is for the benefit of graders in that they do not have to sift through an over amount of extra information.

- The sample will be scored on the basis of grade line, grading factors line, and remarks section for a total of 25 points per sample (200 points total).

- Negative score for any line will be scored as zero points.
How to grade corn and soybean problems

- Grade Line-10 points total
  - Grade-6 points
    - Incorrect by 1 grade: 2 points off
    - Incorrect by 2 grades: 4 points off
    - Incorrect by 3 or more grades: 6 points off
  - Correct Class- 4 points
    - Yellow, White, or Mixed Corn
    - Yellow or Mixed Soybeans
  - Special Factors- 3 points
    - Specific for each grain type

- Grading Factors Line-12 points total
  - All correct: 12 points
  - 2 factors required with 1 correct: 6 points off
  - 3 factors required with 2 correct: 4 points off
  - 3 factors required with 1 correct: 8 points off
  - 4 factors required with 3 correct: 3 points off
  - 4 factors required with 2 correct: 6 points off
  - 4 factors required with 1 correct: 9 points off
  - No factors correct: 12 points off

- Remarks section- 3 points total
  - Specific for each grain type

**Note:** The grade line is a total of 10 points and includes grade, class, and special factors. Students cannot miss more than 10 points on this line. (see examples)

How to grade wheat problems

- Grade Line-10 points total
  - Grade-6 points
    - Incorrect by 1 grade: 2 points off
    - Incorrect by 2 grades: 4 points off
    - Incorrect by 3 or more grades: 6 points off
**Note:** The grade line is a total of 10 points and includes grade, class, dockage, and special factors. Students cannot miss more than 10 points on this line. (see examples)

Samples that are U.S. No. 1 do not require factors listed except the test weight, moisture, and special factors that do not contribute to the grade designation.
Grain Grading Examples

Example 1: Answer

<table>
<thead>
<tr>
<th>GRADE AND KIND</th>
<th>Yellow Corn</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. No. 3</td>
<td></td>
</tr>
<tr>
<td>TEST WEIGHT PER BUSHEL</td>
<td>*56.0 lbs</td>
</tr>
<tr>
<td>MOISTURE</td>
<td>*13.2 %</td>
</tr>
<tr>
<td>PERCENT AGED KERNELS</td>
<td>*0.3 %</td>
</tr>
<tr>
<td>PERCENT DAMAGED KERNELS TOTAL</td>
<td>0.3 %</td>
</tr>
<tr>
<td>FOREIGN MATERIAL</td>
<td>%</td>
</tr>
<tr>
<td>SPLITS</td>
<td>%</td>
</tr>
<tr>
<td>BROKEN CORN AND FOREIGN MATERIAL</td>
<td>%</td>
</tr>
<tr>
<td>SHRUNKEN AND BROKEN KERNELS</td>
<td>%</td>
</tr>
<tr>
<td>DEFECTS TOTAL</td>
<td>%</td>
</tr>
</tbody>
</table>

Sample #1

Example 1: Student Response

<table>
<thead>
<tr>
<th>GRADE AND KIND</th>
<th>Yellow Corn</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. No. 4</td>
<td></td>
</tr>
<tr>
<td>TEST WEIGHT PER BUSHEL</td>
<td>56.0 lbs</td>
</tr>
<tr>
<td>MOISTURE</td>
<td>13.2 %</td>
</tr>
<tr>
<td>PERCENT AGED KERNELS</td>
<td>0.3 %</td>
</tr>
<tr>
<td>PERCENT DAMAGED KERNELS TOTAL</td>
<td>0.26 %</td>
</tr>
<tr>
<td>FOREIGN MATERIAL</td>
<td>%</td>
</tr>
<tr>
<td>SPLITS</td>
<td>%</td>
</tr>
<tr>
<td>BROKEN CORN AND FOREIGN MATERIAL</td>
<td>3.6 %</td>
</tr>
<tr>
<td>SHRUNKEN AND BROKEN KERNELS</td>
<td>%</td>
</tr>
<tr>
<td>DEFECTS TOTAL</td>
<td>%</td>
</tr>
</tbody>
</table>

Sample #1

Incorrect by 1 grade: -2 points
Incorrectly written, not needed: -1 point

Score: 22/25

Example 2: Answer

<table>
<thead>
<tr>
<th>GRADE AND KIND</th>
<th>Yellow Soybeans, Infested</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Sample Grade</td>
<td></td>
</tr>
<tr>
<td>TEST WEIGHT PER BUSHEL</td>
<td>*59.0 lbs</td>
</tr>
<tr>
<td>MOISTURE</td>
<td>*13.7%</td>
</tr>
<tr>
<td>PERCENT AGED KERNELS</td>
<td>%</td>
</tr>
<tr>
<td>PERCENT DAMAGED KERNELS TOTAL</td>
<td>0.8 %</td>
</tr>
<tr>
<td>FOREIGN MATERIAL</td>
<td>%</td>
</tr>
<tr>
<td>SPLITS</td>
<td>%</td>
</tr>
<tr>
<td>BROKEN CORN AND FOREIGN MATERIAL</td>
<td>%</td>
</tr>
<tr>
<td>SHRUNKEN AND BROKEN KERNELS</td>
<td>%</td>
</tr>
<tr>
<td>DEFECTS TOTAL</td>
<td>%</td>
</tr>
</tbody>
</table>

Sample #5

Example 2: Student Response

<table>
<thead>
<tr>
<th>GRADE AND KIND</th>
<th>Mixed Soybeans</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. No. 2</td>
<td></td>
</tr>
<tr>
<td>TEST WEIGHT PER BUSHEL</td>
<td>59.0 lbs</td>
</tr>
<tr>
<td>MOISTURE</td>
<td>13.7 %</td>
</tr>
<tr>
<td>PERCENT AGED KERNELS</td>
<td>%</td>
</tr>
<tr>
<td>PERCENT DAMAGED KERNELS TOTAL</td>
<td>0.8 %</td>
</tr>
<tr>
<td>FOREIGN MATERIAL</td>
<td>%</td>
</tr>
<tr>
<td>SPLITS</td>
<td>%</td>
</tr>
<tr>
<td>BROKEN CORN AND FOREIGN MATERIAL</td>
<td>%</td>
</tr>
<tr>
<td>SHRUNKEN AND BROKEN KERNELS</td>
<td>%</td>
</tr>
<tr>
<td>DEFECTS TOTAL</td>
<td>%</td>
</tr>
</tbody>
</table>

Sample #5

Incorrect by more than 3 grades, incorrect class, and missing special factor: -13 points, but participants cannot miss more than 10 points in this section
Missing factor: -3

Score: 12/25
AGRonomy Exam

What is the agromony exam?
- Exam questions will test general agronomic knowledge of the participant.
- Suggested objectives should be considered when studying for the exam.
- A list of references that will be used to write examinations can be found in the contest manual.

What do participants need to provide?
- Clipboard
- No. 2 Pencil(s)
- Non-scientific calculator
- Purdue Extension Corn and Soybean Field Guide
  - Note: Questions written from this source will be based on information provided in the 2003 Corn and Soybean Field Guide. Participants may, if they wish, use another book, but there will be no guarantee that all questions can be answered using a different year book. To receive copies of the 2003 field guide, contact the Purdue Agronomy Club

What are participants provided with by contest officials?
- Agronomy exam
- Scantron form

Rules for this portion of the contest
- The exam will consist of 40 multiple choice questions (200 points).
- Participants will have 60 minutes to complete the exam.
- Each question is worth 5 points and will be counted wrong if omitted or incorrectly answered.
Agronomy Exam Set-up

Test

- Tests can be provided by the Purdue Collegiate Crops Judging Team by calling (765)-494-4773.

- If writing a test, please refer to the agronomy exam section of the “2011-2015 4-H/FFA Crops Evaluation CDE: Indiana Agronomy Skills Development” for rules and regulations.

- When making the key for tests
  - the year and contest should be clearly marked on the front page
  - All correct answers on the answer sheet should be bolded, underlined, or have an asterisk mark

What to provide participants

- Exam
- Scantron
Agronomy Exam Grading

- Each exam question is worth 5 points
- Exams can be graded by hand or with scantron machine
REFERENCE MATERIALS FOR CONTEST

**Purdue Contact:** Shaun Casteel, Purdue Agronomy  
scasteel@purdue.edu

1. **Purdue Extension Corn and Soybean Field Guide-2003**  
   Contact: Purdue Agronomy Club (765-494-4773)  
   **Copies are also handed out each year at the Purdue Crops CDE Invitational**

2. **Identification kits**  
   Plant mounts and seed samples: Purdue Agronomy Club (765-494-4773).  
   Order forms located at [http://www.agry.purdue.edu/AGRYclub/customers.html](http://www.agry.purdue.edu/AGRYclub/customers.html).

3. **Publications for agronomy exam assistance**  
   Wheat Production and Fertilization in Indiana  
   [http://www.ces.purdue.edu/extmedia/AY/AY-244.html](http://www.ces.purdue.edu/extmedia/AY/AY-244.html)

   Forage Selection and Seeding Guide for Indiana  

   Improving Pastures by Renovation  

   Estimating Crop Residue Cover  

4. **Contest teaching tools**  
   [http://www.four-h.purdue.edu/cde/index.cfm](http://www.four-h.purdue.edu/cde/index.cfm)

   Site includes:
   - Crop and weed identification power points
   - Disease/damage identification power points
   - Insect identification power points
   - Grain grading step by step assistance
   - Old state agronomy exams and keys
   - Order forms for identification kits
Contest Handouts

1. Identification Answer Sheets
2. Grain Grading Answer Sheet
3. Grain Grading Junior Handbook
4. Grain Grading Charts

**Handouts can also be found online at

http://www.ag.purdue.edu/agry/Pages/K12_crops-judging.aspx
4-H/FFA Crops Evaluation CDE
Seeds List (250 points)

Contestant Number: ____________ 
Score: ____/250

Contestant Name: __________________________________ 
Contestant School: __________________________________

Directions: Write in the correct number of the plant that correlates to the correct seed example. Each specimen is worth 10 points.

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

1. alfalfa 25. field pennycress 49. redroot pigweed
2. alsike clover 26. field pepperweed 50. reed canarygrass
3. barley 27. grain sorghum 51. rice
4. barnyardgrass 28. giant foxtail 52. rye
5. bindweed 29. giant ragweed 53. ryegrass
6. birdsfoot trefoil 30. green foxtail 54. shepherdspurse
7. bitter wintercress 31. hairy vetch 55. smooth bromegrass
8. buckhorn plantain 32. hard red winter wheat 56. soft red winter wheat
9. burcucumber 33. horsemnentle 57. soybean
10. Canada thistle 34. horseweed 58. sudangrass
11. canola 35. jimsonweed 59. sweet corn
12. common cocklebur 36. johnsongrass 60. sweetclover
13. common lambsquarters 37. Kentucky bluegrass 61. tall fescue
14. common milkweed 38. Korean lespedeza 62. timothy
15. common ragweed 39. large crabgrass 63. triticale
16. crownvetch 40. morningglory 64. trumpet creeper
17. curly dock 41. oat 65. velvet leaf
18. dandelion 42. orchardgrass 66. white wheat
19. dent corn 43. oxeye daisy 67. white clover
20. downy brome 44. Pennsylvania smartweed 68. wild buckwheat
21. durum wheat 45. Perennial sowthistle 69. wild carrot
22. eastern black nightshade 46. popcorn 70. wild garlic
23. fall panicum 47. quack grass 71. wild mustard
24. flax 48. red clover
4-H/FFA Crops Evaluation CDE
Plants List (250 points)

Contestant Number: ____________
Score: ____/250

Contestant Name: __________________________________________________________

Contestant School: _________________________________________________________

Directions: Write in the correct number of the plant that correlates to the correct plant
mount. Each specimen is worth 10 points.

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

1. alfalfa 24. giant foxtail 47. redroot pigweed
2. alsike clover 25. giant ragweed 48. reed canarygrass
3. barley 26. grain sorghum 49. rye
4. barnyardgrass 27. green foxtail 50. ryegrass
5. birdfoot trefoil 28. hairy vetch 51. shepherdspurse
6. buckhorn plantain 29. hedge bindweed 52. smooth bromegrass
7. burcucumber 30. hemp dogbane 53. soybean
8. Canada thistle 31. horsemintle 54. sudangrass
9. canola 32. horseweed 55. sweetclover
10. common cocklebur 33. ivyleaf morningglory 56. tall fescue
11. common lambsquarters 34. Jerusalem artichoke 57. tall morningglory
12. common ragweed 35. jimsonweed 58. timothy
13. corn 36. johnsongrass 59. trumpet creeper
14. crownvetch 37. Kentucky bluegrass 60. velvetleaf
15. curly dock 38. Korean lespedeza 61. wheat
16. dandelion 39. large crabgrass 62. white clover
17. downy brome 40. oat 63. wild buckwheat
18. eastern black nightshade 41. orchardgrass 64. wild carrot
19. fall panicum 42. oxeye daisy 65. wild garlic
20. field bindweed 43. Pennsylvania smartweed 66. wild mustard
21. field pennycress 44. perennial sowthistle 67. yellow foxtail
22. field pepperweed 45. quackgrass 68. yellow nutsedge
23. garlic mustard 46. red clover
4-H/FFA Crops Evaluation CDE
Disease, Damage, and Insect List (100 points)

Contestant Number: ____________  Score: ____/100

Contestant Name: __________________________________

Contestant School: _________________________________

Directions: Write in the correct number of the plant that correlates to the correct plant mount. Each specimen is worth 10 points.

1. ____________  6. ____________
2. ____________  7. ____________
3. ____________  8. ____________
4. ____________  9. ____________
5. ____________ 10. ____________

1. armyworm
2. blacktip
3. blue eye mold
4. brown spot
5. brown stem rot
6. common rust
7. ergot
8. gray leaf spot
9. green damage
10. heat damage
11. insect damage
12. Japanese beetle
13. manganese deficiency
14. northern corn leaf blight
15. nitrogen deficiency
16. phosphorus deficiency
17. potassium deficiency
18. purple seed stain
19. smut
20. sprout damage
21. soybean aphid
22. sound
23. sudden death syndrome
24. western corn rootworm
25. wheat scab
26. white mold
27. wireworm
# Grain Grading Answer Sheet

## Sample 1

<table>
<thead>
<tr>
<th>GRADE AND KIND</th>
<th>U.S. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEST WEIGHT PER BUSHEL</td>
<td>MOISTURE</td>
</tr>
<tr>
<td>lbs</td>
<td>%</td>
</tr>
</tbody>
</table>

REMARKS

Score ___/25

## Sample 2

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<th>GRADE AND KIND</th>
<th>U.S. No.</th>
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<td>MOISTURE</td>
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<tr>
<td>lbs</td>
<td>%</td>
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REMARKS

Score ___/25

## Sample 3

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<td>MOISTURE</td>
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<tr>
<td>lbs</td>
<td>%</td>
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</tbody>
</table>

REMARKS

Score ___/25

## Sample 4

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<td>MOISTURE</td>
</tr>
<tr>
<td>lbs</td>
<td>%</td>
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</tbody>
</table>

REMARKS

Score ___/25
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<tr>
<th>Sample</th>
<th>REMARKS</th>
<th>GRADE AND KIND</th>
<th>U.S. No.</th>
<th>TEST WEIGHT PER BUSHEL</th>
<th>MOISTURE</th>
<th>HEAT DAMAGED KERNELS</th>
<th>DAMAGED KERNELS (TOTAL)</th>
<th>FOREIGN MATERIAL</th>
<th>SPLITS</th>
<th>BROKEN CORN AND FOREIGN MATERIAL</th>
<th>SHRUNKEN AND BROKEN KERNELS</th>
<th>DEFECTS (TOTAL)</th>
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</thead>
<tbody>
<tr>
<td>#5</td>
<td>Score ____/25</td>
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<tr>
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<td>#7</td>
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</table>
Junior Participant
2011-2015
Grain Grading Handbook

This book is for Junior participants only during a 4-H/FFA Crops Evaluation Contest.
Corn Grading

What is corn?
Corn is defined as any grain which consists of 50 percent or more of whole kernels of shelled dent corn and/or flint corn. It may not contain more than 10 percent of other grains for which grading standards have been established. If it does not meet these standards, the lot is considered mixed grain. However, in this event there will be no mixed grain so any grain other than dent or flint corn is foreign material. *Popcorn, sweet corn, and blue corn in corn grading are foreign material.*

Class and damaged kernels are determined after the removal of foreign material. All percentages shall be determined on the grain as a whole.

Corn Grain Class
There are three possible classes of corn. Percentage of corn classes should be rounded to the nearest tenth.

- **Yellow Corn** - Yellow-kernelled corn that does not contain more than 5 percent corn of other colors.
- **White Corn** - White-kernelled corn that does not contain more than 2 percent corn of other colors.
- **Mixed Corn** - Corn that does not meet the color requirements of white or yellow corn. When completing the grain inspection certificate (answer sheet) record the percent of each corn (class) from greatest to least in percentage to nearest tenth within the "Remarks" section.
- **Other colors** - White corn with a slight tinge of pink is white corn. Yellow kernels with red streaks covering less than 50.0% of the kernel are considered yellow corn. If more than 50.0% of the kernel is red streaked, then the corn is considered Corn of Other Colors. The rules to percentages to determine if the corn is Yellow Corn or Mixed Corn will apply. Since this is not a determining factor in corn, students should write “Red Corn” in the remarks section if it is a determining factor for corn grain class.

Moisture
Moisture is not a grading factor in commercial grain; nevertheless, a loss of quality in stored corn hinges largely on the amount of moisture present in the grain. Moisture is an important factor in most discount schedules.

Moisture is recorded to the nearest tenth of a percent.

- Example: **16.27% is recorded as 16.3%**

Test Weight
Test weight is the amount of weight the grain must have to make up a bushel. Good quality corn of low moisture content can be expected to have a good test weight.

Test weight is recorded to the nearest tenth.

- Example: **52.34 lbs/bu is recorded as 52.3 lbs/bu**
**Broken Corn and Foreign Material**

Broken corn and foreign material is normally determined by the use of a sieve; broken corn and all matter other than corn that pass through a sieve having round openings 12/64th of an inch in diameter, and all matter other than corn that remain on the sieve after screening are included in this factor.

Examples of foreign material
- Sweet corn
- Popcorn
- Blue corn
- Soybeans not passing through the sieve
- Grains or weeds dropping through the sieve
- Rodent excreta and stones (cinders are stones)
  - Note: If the total weight of stones in a 1-1/4 quarts (1,000 gm.) sample exceeds 0.1 percent of the sample weight the sample must be graded "U.S. Sample Grade". When applicable, record "Stones" in the Remarks section of the certificate.

**Do not enter this percentage in the foreign material column on the answer sheet.** There is a column for broken corn and foreign material.

Broken corn and foreign material is recorded to nearest tenth of a percent.

**Heat Damaged Kernels**

Heat damaged corn is severely discolored (brown to black) either from external heating, such as improper drying, or from heating as a result of excessive moisture in storage and spoilage. Kernels in this category will be included in heat damage AND damaged kernels (total).

Slightly damaged corn shows some discoloration (light to dark tan) and therefore is not as severely damaged. The two are **not** added together to determine heat damaged kernels. Slight damaged corn will only be included in damaged kernels (total).

Record to the nearest tenth of a percent.

**Damaged Kernels (Total)**

Damaged kernels (total) includes **all** types of damage found in corn. Darkening of the germ is one of the first indicators of corn declining in quality or that the amount of damage is increasing.

Examples of damaged kernels
- mold damage
- heat damage
- sprout damage
- frost damage
- badly ground-damaged
- badly weather-damaged
- insect damage (not chewed)
- kernels that have become slightly discolored from heat

Note that the percent of heat damage is added to other types of damage to obtain the percent of Damaged Kernels (Total).

Record to the nearest tenth of a percent.
**Musty, Sour, or Heating**
A sample in any of these conditions is “U.S. Sample Grade.”

Musty- Musty, ground, or moldy odor

Sour- Sour, fermenting, or pigpen odor

Heating- Corn developing a high temperature from excessive respiration. Corn will usually have a musty or sour odor. For this contest, samples that are affected by heating will state “corn affected by high temperature” OR “heating.”

Record the applicable words in the “Remarks” section of the grading certificate.

**Commerically Objectionable Foreign Odor**
If the corn carries an odor which does not normally occur in grain and which, for this reason, would render the corn unfit for its normal commercial use, then it is graded “U.S. Sample Grade.”

This includes animal hides, decaying animal or vegetable parts, fertilizer, skunk, smoke, strong weed, oil, etc.

Record the words “Commerically Objectionable Foreign Odor” in the “Remarks” section of the certificate.

**Distinctly Low Quality**
The Federal Grain Inspection Service reserves the use of this term to describe corn when it is obviously of inferior quality and the existing grading factors or guidelines do not accurately reflect the inferior condition.

When a sampler is collecting corn from a rail car, he/she can notice whether the grain also includes two or more large stones, pieces of glass, pieces of concrete, sticks of lumber, or scrap metal or debris which are visible to the sampler but are too large to enter the sampling device, such as a grain probe.

This grading factor should not be confused with the other conditions which can also cause corn to be “Sample Grade,” such as animal filth, cockleburs, crotalaria seed, etc.

Record the words Distinctly Low Quality (Reason).

**Sample Grade Factors**
There is a list of factors that does not meet U.S. number standards and make the sample “Sample Grade” listed on the bottom of the grading chart. These include animal filth, cockleburs, crotalaria seed. If any of these are reported in the sample, participants should grade the sample “Sample Grade” and write the word in the Remarks box.

How to record in the “Remarks” box (see chart for details)
- Stones
- Glass
- Crotalaria Seeds
- Castor Beans
- Unknown Foreign Substance
- Toxic Substance
- Cockleburs
- Animal Filth
- Heating
- Distinctly Low Quality (Reason)

**Special Factors, Special Grade Requirements, Special Grade Designations**

Special grades are conditions which should be noted but **do not** affect the numerical grade.

**Flint**
Corn of any class which consists of **95 percent or more** of flint corn; flint corn is graded and designated according to the grade requirements of the standards applicable to such corn if it were not flint, and the word "Flint" is added to and made a part of the grade designation, immediately following the class name.

Flint corn is a different subspecies of corn with hard starch rather than soft starch as in dent corn.

**Flint and Dent**
Corn of any class which consists of a mixture of flint and dent corn containing **more than 5 percent but less than 95 percent of flint corn**. The words "Flint and Dent" and the percentage of flint corn rounded to the tenth are added to and made a part of the grade designation immediately following the special grade.

**Infested**
Any corn sample 1-1/4 quarts or 1000 g that contains one of the following:
- 2 or more live weevils
- 1 live weevil and 5 or more other live insects injurious to stored grain
- 10 or more other live insects injurious to stored grain

Infested is the condition of live weevils or grain-damaging insects in the grain.

Infested corn is graded and designated according to the grade requirements of the standards applicable to such corn if it was not infested. The word "Infested" is added to and made a part of the grade designation.

**Waxy Corn**
Corn that consists of 95% or more waxy corn. When applicable, the word “Waxy” will be last within the grade designation.
Soybean Grading

What are soybeans?
Soybeans are any grain that consists of 50 percent or more of whole or broken soybeans which will not pass readily through an 8/64 sieve and not more than 10 percent of other grains for which grading standards have been established.

Class, splits, and damaged kernels are determined after foreign material is removed.

Soybean Grain Class
There are two possible classes of soybeans. Percentage of soybean classes should be rounded to the nearest tenth.

- **Yellow Soybeans** - Soybeans that have a yellow seed coat and are yellow in cross-section. Sample does not contain more than 10 percent of other colors.
- **Mixed Soybeans** - Any mixture of soybeans that does not meet the requirements of yellow soybeans (See Soybeans of Other Colors). When completing the grain inspection certificate, record the percent of each color of soybeans from greatest to least in the Remarks section.
- **Soybeans of Other Colors** - These colors serve as a grading factor in yellow soybeans. When soybeans of other colors (black, brown, and bi-colored) occur in quantities of 10 percent or less, the percentage is a factor in determining the grade of yellow soybeans. When other colors exceed 10 percent, the sample is then classified as Mixed Soybeans (see above). Soybeans of other colors is listed in the Remarks section.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Yellow Soybeans</td>
<td>85.0%</td>
<td>Mixed Soybeans</td>
</tr>
<tr>
<td>Bi-color Soybeans</td>
<td>15.0%</td>
<td></td>
</tr>
<tr>
<td>Yellow Soybeans</td>
<td>95.0%</td>
<td>Yellow Soybeans</td>
</tr>
<tr>
<td>Bi-color Soybeans</td>
<td>5.0%</td>
<td>Soybeans of other colors</td>
</tr>
</tbody>
</table>

Test Weight
Test weight is the amount of weight the grain must have to make up a bushel. Good quality seed of low moisture content can be expected to have a good test weight. **Test weight has no effect on the grade of soybean samples.**

Record test weight rounded to the nearest tenth.

Moisture
The moisture content of soybean seed is extremely important but it is no longer used as a grading factor. Loss of quality of stored seed hinges largely on the amount of moisture present in the sample. Moisture is an important factor in most discount schedules.

Record moisture to the nearest tenth of a percent.
Splits
Any soybean having more than 1/4 of the seed missing is considered a split. Splits are determined on a portion of approximately 125 grams after the removal of all foreign material.

This factor includes only sound splits - those free from damage.

Damaged splits are only recorded in Damaged Kernels (Total).

Splits are recorded to the nearest tenth of a percent.

Heat Damage
Heat damaged soybeans are severely discolored (black or dark brown) either from external heating, such as improper drying, or from heating as a result of excess moisture and spoiling. Almost all heat damage is the result of storing grain too wet. Soybeans in this category will be included in heat damage AND Damaged Kernels (Total).

Slightly damaged soybeans show some discoloration (light to dark tan) and therefore are not as severely damaged. The two are not added together to determine heat damaged kernels. Slight damaged soybeans will only be included in Damaged Kernels (Total).

Record heat-damaged kernels to the nearest tenth of a percent.

Damaged Kernels (Total)
This factor includes all types of damage found in whole and pieces of soybeans.

Examples of Damaged Kernels
- heat damage
- sprout damage
- frost damage
- immature seed
- ground-damage
- mold damage
- insect damage (not chewed)
- kernels that have become slightly discolored from heat
- heat damage
- stink bug stung kernels**

**Stink bug stung kernels are considered damaged kernels at the rate of 1/4 of actual total percentage of stung kernels
Example: 12 grams is considered as 3 grams of damage

Record Damage Kernels (Total) to the nearest tenth of a percent.
**Foreign Material**

Foreign material is normally determined by the use of a sieve and separated into coarse and fine foreign material.

Coarse foreign material includes material that does not pass through an 8/64 inch sieve and made on 1000 grams.

Fine foreign material includes material that passes through an 8/64 inch sieve and material and pieces of soybean that remains on top of the sieve after sieving. This test is made on 125 grams.

Examples of foreign material
- corn
- cockleburs
- sticks
- stalks
- rodent excreta
- stones
- other grains

Record to the nearest tenth of a percent.

**Distinctly Low Quality**

The Federal Grain Inspection Service reserves the use of this term to describe soybeans when it is obviously of inferior quality and the existing grading factors or guidelines do not accurately reflect the inferior condition.

When a sampler is collecting soybeans from a rail car, he/she can notice whether the grain also includes two or more large stones, pieces of glass, pieces of concrete, sticks of lumber, or scrap metal or debris which are visible to the sampler but are too large to enter the sampling device, such as a grain probe.

This grading factor should not be confused with the other conditions which can also cause soybeans to be “Sample Grade”, such as animal filth, cockleburs, crotalaria seed, etc. Record the words Distinctly Low Quality (Reason).

*(See corn for example of how to record).*

**Musty, Sour or Heating**

A sample in any of these conditions is "U.S. Sample Grade".

Musty- Musty, ground, or moldy odor

Sour- Sour, fermenting, or pigpen odor

Heating- Soybeans developing a high temperature from excessive respiration. Soybeans will usually have a musty or sour odor. For this contest, samples that are affected by heating will state “Soybeans affected by high temperature” OR “heating.”

Record the applicable words in the “Remarks” section of the grading certificate.

*(See corn for example of how to record)*
Commercially Objectionable Foreign Odor
If the soybeans carry an odor which does not normally occur in grain and which, for this reason, would render the soybeans unfit for its normal commercial use, then it is graded "U.S. Sample Grade."

This includes animal hides, decaying animal or vegetable parts, fertilizer, skunk, smoke, strong weed, oil, etc.

Record the words "Commercially Objectionable Foreign Odor" in the "Remarks" section of the certificate.

(See corn for example of how to record)

Sample Grade Factors
There is a list of factors that automatically make the sample “Sample Grade” listed on the bottom of the grading chart. These include animal filth, cockleburs, crotalaria seed. If any of these are reported in the sample, participants should grade the sample “Sample Grade” and write the word in the “Remarks” box.

How to record in the “Remarks” box (see chart for details)
- Stones
- Glass
- Crotalaria Seeds
- Castor Beans
- Unknown Foreign Substance
- Toxic Substance
- Cockleburs
- Animal Filth
- Heating
- Distinctly Low Quality (Reason)

Cumulative Total
If a cumulative total of 11 or more sample grade factors are found, the sample is graded "U.S. Sample Grade."

These factors include any combination of animal filth, castor beans, crotalaria seeds, glass, stones, and any unknown foreign substance.

When applicable, record “Cumulative Total” in the “Remarks” section. You are not required to list the factors that cumulate to this total.

Special Factors, Special Grade Requirements, Special Grade Designations
Special grades are conditions which should be noted but do not affect the numerical grade.

Garlicky
Specific types of garlic bulbs found in the sample may be considered a special factor.

Green bulbs- husk is still intact, contains three or more green bulblets in 1000 grams

Dry bulbs- husk is dry or missing, 3 dry bulbs= 1 green bulb

The word “Garlicky” is added to and made a part of the grade designation. A garlic odor is not a basis for "Garlicky."
**Infested**
Any soybean sample that contains one of the following:
- two or more live weevils
- one live weevil and 5 or more other live insects injurious to stored grain
- 10 or more other live insects injurious to stored grain

Infested is the condition of live weevils or grain-damaging insects in the grain.

Infested soybeans are graded and designated according to the grade requirements of the standards applicable to such soybeans if it was not infested. The word “Infested” is added to and made a part of the grade designation.

**Purple Mottled or Stained**
Soybeans that are discolored with pink or purple seed coats, dirt or dirt-like substance, or pokeberry stains, as determined on a portion of 400 grams with the use of an FGIS Interpretive Line Print. The Interpretive Line Prints are help tools for inspectors to judge whether or not a kernel is damage or not.

Samples with this condition will state “Purple Mottled or Stained” as the description.

The words "Purple Mottled or Stained" are added to and made part of the grade designation.
Wheat Grading

What is Wheat?
Wheat is any grain of common wheat, club wheat, and durum wheat, which before the removal of dockage, consists of 50 percent or more of these wheats and not more than 10 percent of other grains for which standards have been established and which, after the removal of dockage, contains 50 percent or more of whole kernels of one or more of these wheats.


Soft Red Winter Wheat is the only wheat class that will be graded in this event, and the following discussion will pertain only to Soft Red Winter Wheat. The class Soft Red Winter Wheat includes all varieties of Soft Red Winter Wheat. There are no subclasses in this class.

Basis of Determination
Each determination of dockage, moisture, temperature, odor, garlic, live weevils or other insects injurious to stored grain, and distinctly low quality completed on the grain as received when taken from an incoming truck, rail car, etc. All other "tests" are conducted after dockage has been removed.

Test Weight
Test weight is the amount of weight the grain must have to make up a bushel. Good quality wheat of low moisture content can be expected to have a good test weight.

Record test weight rounded to the nearest tenth of a percent.

Moisture
The moisture content of wheat seed is extremely important but it is no longer used as a grading factor. Loss of quality of stored seed hinges largely on the amount of moisture present in the sample. Moisture is an important factor in most discount schedules.

Moisture is recorded to the nearest tenth of a percent.

Dockage
The word "dockage" means weed seed, weed stems, chaff, straw, grain other than wheat, sand, soil, and any other material other than wheat, that can be removed readily from the wheat by the use of appropriate sieves and cleaning devices. Also, the underdeveloped, shriveled, and small pieces of wheat kernels removed in properly separating the material other than wheat plus that which cannot be recovered by properly rescreening or recleaning is also a part of dockage.

Determination of dockage is made in the initial sieving. Shrunken and broken kernels and foreign material are determined after the dockage has been removed. Dockage is determined from a 1,000 gram sample.

The percent dockage is rounded and reported to the nearest tenth percent. Always list dockage last of all of the special factors. See example on the special factors page.
**Foreign Material**
Foreign material refers to all matter other than wheat, including stones, that is not separated from the wheat in the proper removal of dockage.

Examples of foreign material
- corn
- cockleburs
- sticks
- stalks
- rodent excreta
- stones
- other grains
- ergoty wheat

Record to the nearest tenth of a percent.

**Contrasting Classes**
A contrasting class in soft red winter wheat is durum wheat.

Soft red winter wheat flour is especially suited for cake mixes while flour from durum wheat is required for pasta production. Thus, there is a "contrast" in use. Each wheat has its own "Contrasting Classes."

Record in Remarks area of certificate "Contrasting Classes" and state to the nearest tenth of a percent.

**Wheat of Other Classes (Total)**
This factor spotlights the presence of other wheats in a sample. Some mixtures may be of minor importance. For example, if a soft red winter wheat contained 8.0% hard red winter wheat, the flour from such a mixture might be acceptable, but not the most desirable for cake mixes when compared to flour from 100.0% soft red winter wheat.

Wheat of Other Classes (Total) also includes percent of Contrasting Classes.

Record "Wheat of Other Classes (Total)" and state to the nearest tenth of a percent in the "Remarks" section.

**Other Grains**
Other grains as used in this discussion are:
- rye
- oats
- corn
- grain sorghum
- barley
- flax
- emmer
- spelt
- einkorn
- polish wheat
- poulard wheat
- cultivated buckwheat
- soybeans

These grains are also considered foreign material, even when damaged.
Heat Damage
Heat damage in wheat is severely discolored (black or dark brown) kernels and pieces of kernels of wheat and other grains caused either from external heating, such as improper drying, or from heating as a result of excess moisture and spoiling. Almost all heat damage is the result of storing grain too wet. Soybeans in this category will be included in heat damage AND damaged kernels (total).

Slightly damaged wheat and other grains show some discoloration (light to dark tan) and therefore are not as severely damaged. The two are not added together to determine heat damaged kernels. Slight damaged wheat and other grains will only be included in damaged kernels (total).

Record heat-damaged kernels to the nearest tenth of a percent.

Insect Damaged Wheat Kernels
Wheat is determined to be “U.S. Sample Grade” when 32 or more insect damaged kernels per 100 grams are found. This is up to a 3 stage process. For simplicity in this event, the number of kernels per 100 gram will be given.

Do not confuse insect chewed with insect damage.
When applicable, include in the “Remarks” section of the certificate "32 or more Insect Damaged Kernels."

Damaged Kernels (Total)
This factor includes all types of damage found in wheat. It is very inclusive in that kernels and pieces of kernels of wheat plus other grains (Ex. Sprout-damaged Oats) are also included.

Examples of Damaged Kernels
- heat-damage
- sprout damage
- frost damage
- Insect damage (not chewed)
- badly ground-damage
- badly weather-damage
- mold damage
- disease or otherwise materially damage

Damaged Kernels (Total) is recorded to the nearest tenth of a percent

Shrunken and Broken Kernels
These are kernels and pieces of kernels of wheat and other matter that will pass readily through a .064 x 3/8 inch oblong hole sieve after the dockage has been removed.

Record to the nearest tenth of a percent.

Defects (Total)
This factor is determined by adding the percentages of Damaged Kernels (Total), Foreign Material, and Shrunken and Broken Kernels.
**Distinctly Low Quality**
The Federal Grain Inspection Service reserves the use of this term to describe wheat when it is obviously of inferior quality and the existing grading factors or guidelines do not accurately reflect the inferior condition.

When a sampler is collecting wheat from a rail car, he/she can notice whether the grain also includes two or more large stones, pieces of glass, pieces of concrete, sticks of lumber, or scrap metal or debris which are visible to the sampler but are too large to enter the sampling device, such as a grain probe.

This grading factor **should not** be confused with the other conditions which can also cause wheat to be "Sample Grade," such as animal filth, cockleburs, crotalaria seed, etc.

Record the words Distinctly Low Quality (Reason).

**Musty, Sour or Heating**
A sample in any of these conditions is "U.S. Sample Grade."

Musty- Musty, ground, or moldy odor

Sour- Sour, fermenting, or pigpen odor

Heating- Wheat developing a high temperature from excessive respiration. Wheat will usually have a musty or sour odor. For this contest, samples that are affected by heating will state "Wheat affected by high temperature" OR "heating."

Record the applicable words in the “Remarks” section of the grading certificate.

**Commercially Objectionable Foreign Odor**
If the wheat carries an odor which does not normally occur in grain and which, for this reason, would render the wheat unfit for its normal commercial use, then it is graded "U.S. Sample Grade."

This includes animal hides, decaying animal or vegetable parts, fertilizer, skunk, smoke, strong weed, oil, etc. **This does not include smutty or garlicky odor.**

Record the words "Commercially Objectionable Foreign Odor" in the “Remarks” section of the certificate.
Sample Grade Factors
There is a list of factors that automatically make the sample “Sample Grade” listed on the bottom of the grading chart. These include animal filth, cockleburs, crotalaria seed. If any of these are reported in the sample, participants should grade the sample “Sample Grade” and write the word in the “Remarks” box.

How to record in the “Remarks” box (see chart for details)
Stones
- Glass
- Crotalaria Seeds
- Castor Beans
- Unknown Foreign Substance
- Toxic Substance
- Cockleburs
- Animal Filth
- Heating
- Distinctly Low Quality (Reason)

Cumulative Total
If a cumulative total of 5 or more sample grade factors (e.g. 3 stones + 1 animal filth + 1 unknown = 5 or more sample grade factors) are found, the sample is graded “U.S. Sample Grade.” Record "Cumulative Total" in the “Remarks” section.

Special Factors, Special Grade Requirements, Special Grade Designations
Special grades are conditions which should be noted but do not affect the numerical grade.

Ergoty
Wheat that contains more than 0.05 percent per 1000 grams ergot is considered Ergoty.

The word "Ergoty" is added to and made part of the grade designation.

Note that ergot also fits the definition of foreign material in wheat and must be included as such.

Garlicky
Specific types of garlic bulbs found in the sample may be considered a special factor.

Green bulbs- husk is still intact, contains three or more green bulblets in 1000 grams

Dry bulbs- husk is dry or missing, 3 dry bulbs= 1 green bulb

The word “Garlicky” is added to and made a part of the grade designation. A garlic odor is not a basis for "Garlicky."
Infested
Any wheat sample that contains one of the following:
- two or more live weevils
- one live weevil and 1 or more other live insects injurious to stored grain
- 2 or more other live insects injurious to stored grain

Infested is the condition of live weevils or grain-damaging insects in the grain.

Infested wheat is graded and designated according to the grade requirements of the standards applicable to such wheat if it was not infested. The word "Infested" is added to and made a part of the grade designation.

Smutty
There are two special grades of smutty wheat -- Light Smutty and Smutty.

- **Light Smutty** - Applies to wheat with a smutty odor, or when wheat contains 6-30 smut balls in 250 grams of grain; the term "Light Smutty" is added to and made part of the grade designation.

- **Smutty** - Applies to wheat that contains 31 or more smut balls per 250 gram sample; the word "Smutty" is added to and made part of the grade designation

Treated Wheat
Treatments of wheat include:
- Scoured
- Limed
- Washed
- Sulphured