

North Dakota State 4-H CROP JUDGING Event Guidelines

Updated January 2021

1. The state 4-H crop judging event will take place during the North Dakota Winter Show.
2. This guide shall be used as the official guidelines for the contest and the following printed materials may be used as resources in preparation for the crop judging event.
 - GCA671 North Dakota Crop Seed Identification Guide
 - GCA672 Identifying Weeds and Their Seeds
 - GCA673 Market Grade Factor Identification scorecard - Hard Red Spring Wheat
 - GCA674 Weed Seed Identification scorecard
 - GCA675 Weed Mount Identification scorecard
 - GCA676 Market Grain Classes scorecard
 - GCA677 Crop Judging Classes scorecard
 - GCA678 Market Class Grain Inspection Report
 - GCA679 Junior Insect and Equipment/Machinery Identification Card
 - GCA687 Crop and Weed Seed Identification scorecard
 - GCA688 Crop and Weed Plant Identification scorecard
 - GCA681 Insect Identification scorecard
 - GCA682 Equipment Identification scorecard
 - GCA689 Agronomy Disorders scorecard
 - GCA690 Equipment and Machinery ID Scorecard
 - ***** Wheat Grain Grading Requirements (chart)
3. The following divisions will be available.
 - Senior division: 4-H members age 14-18 at the start of the 4-H year (before September 1).
 - Junior division: 4-H members age 8-13 at the start of the 4-H year (before September 1).**
 - Open division: Any youth (all ages) or adult not eligible for one of the 4-H divisions, or a dual 4-H/FFA member wishing to judge FFA only.**Note: youth age 13 at the start of the 4-H year are eligible in either the senior or junior 4-H division.
4. Contestants must be enrolled in 4honline as 4-H members in the county they represent.
5. Counties may enter any number of participants in any of the divisions.
6. Scores of the top three individuals from a county will be combined for the team score. Counties with less than three participants in a division may combine with other counties to form a team of three or more, provided that no county involved has more than two participants in that division. The combination teams must register together.
7. The 4-H dress code will be required in the senior and junior divisions.

Contest operation and scoring

1. Use names and other factors as provided in this guide.
2. A committee of Extension agents and volunteers will score cards.
3. An incorrect answer will be considered an error in identification and will be considered one incorrect answer. Extra factors will be discounted as an incorrect answer.
4. Ties will be broken if individual awards are involved. If a tie still exists, each class will be compared in the following order: Hard Red Spring Wheat seed class, barley seed class, oat seed class, market grade determination, market factor identification, seed identification, plant identification, insect identification, equipment identification, disorders. Within each class, the ranking will be determined by 1) total score of class 2) reasons score of classes. Finally, if a tie exists after all classes have been compared, it will be broken on neatness and spelling.

5. Clipboards may be used in the event. Clipboards must be clean and have no information other than participant's name and hometown, school, or county.
6. Twelve minutes will be provided for each station. After ten minutes, a two minute warning will be provided.
7. Flashlights and magnification devices may be used only with event supervisors' permission (students with vision impairments, etc. only)

Contest classes for the Junior 4-H State Contest

1. Hard Red Spring Wheat - 100 points (40 for placing, 60 for reasons)
 2. Malting Barley - 100 points (40 for placing, 60 for reasons)
 3. Oats - 100 points (40 for placing, 60 for reasons)
 4. Identification of 10 insects and 10 equipment items (5 points each, matching names only) – 100 points
 5. Identification of 10 weed seeds only - 100 points
 6. Identification of 10 weed plants only - 100 points
 7. Hard Red Spring Wheat (Factor identification) - 100 points
 8. Market Grading – HRS or Durum wheat - 100 points (Participants in the 4-H junior division market grading class, do not record percent protein and grade determining factor.)
- TOTAL POINTS - 800

Senior 4-H Contest (Open division will judge senior 4-H contest) Class included in the 4-H senior contest will be like the FFA Agronomy contest.

1. Wheat (hard red spring and durum) 100 points (40 for placing, 60 for reasons)
 2. Malting Barley 100 points (40 for placing, 60 for reasons)
 3. Oats 100 points (40 for placing, 60 for reasons)
 4. Identification of 15 seeds 150 points (mixture of crops and weeds)
 5. Identification of 15 plants 150 points (mixture of crops and weeds)
 6. Market Grade Description and Evaluation – Spring Wheat and/or Durum (paper class) 100 points
 7. Disorders- 100 points -Ten samples will be identified according to category, causal agent and damage location. Pictures must demonstrate how the agent has affected the plant. For example: pictures of nematodes are not acceptable. Rather, the pictures will be of plants affected by nematodes.)
 8. Insect Identification- 100 points - Ten samples will be identified according to insect name, life cycle, economic impact and mouth part. Pictures, live specimens, or mounts may be used to identify insects.
 9. Identification of Equipment - 100 points (20 samples from the state equipment list. Samples may appear as actual equipment, scale models, toys, or pictures. Major components that are unique to a certain piece of equipment can also be used.)
- TOTAL POINTS - 1000

The state 4-H contest will not include the soil component or team problem. Some local or area contests may have these two components included in the senior 4-H division.

Awards

1. Awards will be distributed according to the Winter Show schedule.
2. Senior and junior division participants are eligible for the following:
 - a. Ribbons will be awarded to approximately 50% of participants.
 - b. High overall individual to receive plaque sponsored by the Valley City Lion's Club.
 - c. Recognition ribbons presented to the top four individuals of teams placing second or third in each division.
 - d. The top four members of the first place team in each division will receive plaques sponsored by the North Dakota Crop and Seed Improvement Association.
3. Open division participants are eligible for the following:
 - a. Ribbons will be presented to the top ten individuals.

Contest Content and Procedures

A. Seed Grain Classes - A crop can be no better than the quality of seed sown. In this section of crop selection the individual evaluates four (4) samples of grain, identifies factors that affect seed quality and ranks these samples for seed purposes. To place one sample of seed over another, you must know the seriousness of the various factors and their order of importance. To provide a basis for ranking classes, individual factors are grouped according to their importance, and these groups are ranked.

The crop judge must learn to identify and name the individual factors (such as stones or frost damaged seed) and then list them on their scorecard. Each factor found in a sample must be specifically identified. (Example - write chaff/straw not inert matter.) There may be from zero (pure) to three (3) factors per pan.

Samples are evaluated by each contestant and placed in accordance with the order of importance of the factor found in each sample. If a sample has no defects, the word pure must be written on the "reasons" line on the scorecard. The most serious factor in each sample of a class will be different to determine the correct placing for the class. For example: only one sample of the four may contain seeds designated as prohibited noxious weeds (although that seed sample may have up to three kinds of prohibited noxious weed seeds present).

Correct weed and crop names shall be used as listed in this publication. Correct spelling of weed and seed names is recommended. However, points will not be deducted if the word is recognizable.

A minimum of six (6) seeds or other identifiable items per factor will be present in each sample. Do not count seeds - factors will be obvious but may be difficult to see (example: barley in oats).

Scoring - Forty (40) points will be allowed for the correct placing using the cut card as the basis for grading (even cuts). Sixty (60) points (15 per line) will be allowed for reasons. Placing and reasons scores are added together to give the total score for each class. (100 points). Failure to indicate the correct sample numbers in each row or to place a sample will result in a zero placing score. Failure to identify the class will result in a deduction of ten (10) points. The accepted class names are: HRSW or Hard Red Spring Wheat; Barley or Malting Barley; Durum; Oats. If a contestant duplicates two numbers in making his/her placing, the lowest possible score will be used.

Always use the stirring sticks present in each sample – do not use fingers, pencils or other items.

Remove coat so sleeves do not tip pans. Use extra care not to mix the samples or spill the entire sample.

Seed class factors are to be considered in order of importance with the least serious factors given first are:

1. **Inert Matter** includes soil, chaff/straw, sticks, stones, insect parts, rodent contamination, and bird contamination. These factors are less serious and detract from the appearance of crop seed but do not affect its quality or germination.

2. **Appearance and Texture** include starchiness and low test weight. Starchiness and lack of plumpness contribute to poor appearance and texture of the seed sample. Starchiness is found in wheat samples only and an obvious content of starchy kernels will be present in the sample of HRSW or Durum. Test Weights provided which are below the minimum test weight for U.S #1 grade is to be identified as "low test weight". Minimum test weights = HRSW- 8, Durum-60, Barley-47, Oats-36

3. **Diseases** accepted as part of the contest include:

HRSW & Durum: blackpoint, scab, smut, and ergot.

Malting Barley: blight, ergot, and smut.

Oats: ergot and blight.

4. **Damages** accepted as part of the contest include:

HRSW & Durum: broken, heat, green, sprout, frost and weathered.

Malting Barley: skinned, broken, heat, sprout, and weathered.

Oats: weathered, hulled and sprouted.

5. **Contrasting Classes** of wheat are obvious mixtures of HRSW and Durum. For Malting Barley, class mixtures are obvious mixtures of white and blue aleurone varieties. A vial or bag of pearled barley will be included in the pans to be considered to determine contrasting classes. (Pearled barely in bags or vials should not be considered skinned.)

6. **Other Crop Seeds** - indicates that other crop seeds are mixed in a seed sample (such as rye in wheat or oats in barley). Other crop seeds that could be found in a seed sample include: Alfalfa, Barley, Buckwheat, Black Turtle Bean, Canola, Corn, Crambe, Durum, Field Pea, Flax, Foxtail Millet, Hard Red Spring Wheat, Lentils, Navy Bean, Oats, Pinto Bean, Proso Millet, Reed Canarygrass, Rye, Safflower, Smooth Brome, Sorghum (grain), Soybean, Sudangrass, Sugarbeet, Sunflower (non-oil), Sunflower (oil), Sweetclover, Triticale, Yellow Mustard.

7. **Other Weed Seeds** - all seeds from the Official Weed List not included as Prohibited or Restricted Noxious.

8. **Low Germination** - any percent given below the minimum standard germination is to be called "Low Germination". Minimum acceptable percentage for all grains = 85 % germination

9. **Restricted Noxious Weeds** include seeds of weeds that are very objectionable in fields or weed seeds that are hard to clean out of crop seed. Under North Dakota State Seed Law, crop seed containing more than specified amounts of these seeds must be labeled accordingly.

10. **Prohibited Noxious Weeds** are persistent and difficult to control weeds that reproduce by seed, or spread by roots or underground stems. Under North Dakota Seed Law, crop seed containing these seeds cannot be sold. The 4-H crop judging contest pan classes may include seeds of the following Prohibited Noxious Weeds.

| | | | |
|----------------|----------------------|------------------|------------------|
| Canada Thistle | Field Bindweed | Hoary Cress | Leafy Spurge |
| Musk Thistle | Perennial Sowthistle | Russian Knapweed | Spotted Knapweed |

B. Plant and Seed Weed Identification - 15 plants and 15 seeds will be identified at a value of 10 points per correct answer for a total of 300 points. Mounts, live plants, or photographs may be used for the plant identification class.

Official Weed List (56)

Prohibited Noxious Weeds

- Absinth Wormwood**
- Canada Thistle
- Dalmation Toadflax**
- Diffuse Knapweed**
- Field Bindweed
- Hoary Cress
- Houndstongue*
- Leafy Spurge
- Musk Thistle
- Palmer Amaranth*
- Perennial Sowthistle
- Purple Loosestrife**
- Russian Knapweed
- Saltcedar**
- Spotted Knapweed
- Yellow Starthistle**
- Yellow Toadflax**

Restricted Noxious Weeds

- Dodder
- Hedge Bindweed #
- Quackgrass
- Wild Oat

Other Weeds.....

- Barnyardgrass
- Biennial wormwood**
- Common Cocklebur
- Common Lambsquarters
- Common Mallow
- Common Milkweed
- Common Ragweed
- Curly Dock
- Dandelion**
- Downy brome**
- Eastern Black Nightshade
- Erect Knotweed** #
- Field Pennycress
- Field Sandbur
- Flixweed**
- Foxtail Barley**
- Giant Ragweed
- Green Foxtail
- Kochia
- Lanceleaf Sage
- Marestail**
- Marshelder
- Nightflowering Catchfly
- Prickley Lettuce
- Prostrate Knotweed**
- Prostrate Pigweed** #
- Redroot Pigweed
- Russian Thistle
- Smartweed
- Waterhemp**
- Wild Buckwheat
- Wild Mustard
- Wild Proso Millet
- Wild Sunflower
- Yellow Foxtail

* For reference only, these weeds will not be included in plant or seed identification or pan classes.

** Plant Identification only. Seeds of these twelve species of weeds will not be used in crop judging events because they are not generally found in North Dakota grain or seed.

These weeds are not included in the 2017 revision of the "Identifying Weeds and Their Seeds" publication. However, they may still be included in some contest.

Official Grain and Forage Crops List (35 seeds, 30 plants)

| | | |
|---------------------|-------------------|--------------------------------|
| Alfalfa | **Lentils | Soybean |
| *Barley - two row | Millet - Foxtail | Sudangrass |
| Barley - six row | Millet - Proso | **Sugarbeet |
| **Black Turtle Bean | **Navy Bean | **Sunflower - Non-oil |
| **Buckwheat | Oats | **Sunflower - Oil |
| **Canola | **Pinto Bean | Sweetclover |
| **Corn | Reed Canarygrass | **Triticale |
| **Crambe | *Russian Wild Rye | Wheat - Durum |
| Field Bean*** | Rye | Wheat - Hard Red Spring (HRSW) |
| Field Pea | Safflower | *Wheatgrass, Crested |
| Flax | Smooth Brome | *Wheatgrass Slender |
| *Kentucky Bluegrass | Sorghum | **Yellow Mustard |

*Plant and seed identification only (not included in seed grain pan classes)

**Seed identification and pan classes only

***In Plant Identification - black turtle bean, navy bean & pinto bean are "field beans". The term "field bean" is not used in seed ID or pan classes.

Plants and seeds may be available for purchase from Dale Hruby. Contact: Dakota Mounts, 1533 Portland Drive, Bismarck, ND 58504 or call (701)222-4683.

C. Identifying Market Grade Factors of Wheat

Ten samples will be inspected in this class. Participants examine each sample and identify the obvious factor that most limits or determines the final market grade. Check only one factor for each sample. There will be one obvious readily identifiable factor present in the sample. Each sample represents an unspecified quantity of grain to be used as feed or food - not for seed. If no limiting factor is present, identify it as No Defects US #1.

Scoring - Ten (10) points per correct answer, ten (10) samples per class for a total of 100 points. Place an (X) in the single market factor box that most affects the grade and value of the sample.

Factors to be identified include the following:

1. No Defects US No.1. Refers to wheat that is nearly free of defective kernels or contaminants. None of the factors listed are present in the sample that would limit its quality as a food.
2. Kernel Damage Heat. Kernels or pieces of grain that are distinctly discolored, black or dark brown throughout (into the endosperm or interior of the kernel) many also appear swollen and puffy. This can be caused by extreme external heat, or as a result of heating /fermentation in storage. Almost all heat damage is the result of storing grain too wet.
3. Kernel Damage Frost. Signs of frost damage are green, black or brown kernels; frost blisters extending around the kernel and into the crease; bran coat partially flaked off; or wax-like, candied or caramelized appearance along with typically dull coffee-brown color; and blistered bran coat extending into the crease.
4. Kernel Damage Green. A distinctive green coloration of kernels is caused by premature harvesting of the grain or the presence of late maturing heads. Many of the green kernels are shriveled and not filled.
5. Kernel Damage Sprout. Kernels with the germ end broken open from germination with the root or shoot visible, or kernels that have sprouted so much that the bran or hull over the germ is broken. Check germ ends and hulls where sprouts (either root or shoot) may have broken off in handling the grain.
6. Blackpoint or Scab. Kernels affected by scab often have a) a pinkish appearance due to mold growth, b) a dull, lifeless and chalky appearance as a result of decay, c) germ with moldy appearance, d) mold in the kernel crease, e) the bran coat is broken open. Blackpoint is a fungus that causes black coloration of the germ face and covers more than 1/2 of the germ.
7. Foreign Material. This is all material other than wheat remaining in the sample after the removal of dockage and cracked and broken kernels.

8. Low Test Weight per Bushel. A price discount is usually assessed on low test weight wheat.

Low test weight is an indicator of yield and is a factor that often determines numerical grade if other factors are not significant. Test weight will be clearly provided and test weight not meeting minimum standard weights per bushel should be checked (see Seed Class Rules - Appearance and Texture.)

9. Broken Kernels. Mechanically damaged wheat kernels and pieces of kernels of a dockage-free sample that will readily pass through a 0.064 by 3/8 inch oblong holed sieve.

10. Contrasting Wheat Classes. The sample of hard red spring wheat contains an obvious quantity of durum wheat, white wheat or other unclassified wheat.

11. Treated & Condemned. Wheat that has been scoured, limed, washed sulfured, or commercially treated in any way that true quality is not reflected by numerical grade. Look for evidence of fungicidal or insecticidal treatment (artificially colored kernels) which the US Food and Drug Administration holds to be detrimental to the health of wheat consumers or unfit for human or livestock consumption.

12. Inseparable Stone. Concreted, earthy or mineral matter and other substances of similar hardness that do not disintegrate readily in water fit in this category.

13. Contamination Rodent or Bird. Rodent pellets or bird droppings are obviously present in the sample

14. Ergotty. The sample contains obvious quantities of ergot. Look for purplish to black bodies in place of normal kernels in the sample.

D. Market Grade Description and Evaluation of Spring Wheat and Durum (GRAIN GRADING)

From information provided on a market class Grain Inspection Report contestants will determine grade, sub-class, special grade (including dockage and protein %) and the grade determining factor, of five (5) lots of hard red spring wheat and/or durum.

Grade - is determined by comparing given percentages from the grain inspection report to the grading chart. If a factor does not meet the minimum test weight or maximum allowed percentage in any grade and does for a lower grade, the grade given to the lot will remain at the lower grade. Grades used are: U.S. No. 1, U.S. No. 2, U.S. No. 3, U.S. No. 4, U.S. No. 5 and U.S. Sample.

Subclass - determined by the charts expressing subclasses based on the percentage of Hard Vitreous Kernels in the lot. Be sure to use the Hard Red Spring Wheat or Durum chart that pertains to the lot. Abbreviations as shown in the chart may be used.

Special Grade - give these special grades to the lot if applicable. Write the special grade in the box provided or write None and/or a diagonal slash, in the box provided.

Ergoty - contains more than 0.05% of ergot

Garlicky - contains more than 2 green garlic bulblets (or an equivalent quantity of dry bulblets) per 1000 gram sample.

Infested - infested with live weevils injurious to stored grain.

Treated - has been scoured, limed, washed, sulfured, or commercially treated in such a manner that the true quality is not reflected by either the numerical grade or the U.S. sample grade alone.

Light Smutty - Wheat that has an unmistakable odor of smut, or which contains 6 to 30 smut balls, portions of smut balls or spores of smut per 250 gram sample.

Smutty - contains more than 30 smut balls, portions of smut balls, or spores of smut per 250 gram sample.

% Protein - (HRSW and Durum) Round the amount given in the grain inspection report to the nearest tenth of a percent. (example: 14.24 = 14.2; 14.25 = 14.3; 14.26 = 14.3; etc.) Protein percentage will be given for Hard Red Spring Wheat and Durum. If protein is not provided, write None, a diagonal slash or 0 in the box.

% Dockage - Round the amount given in the grain inspection report to the nearest tenth of a percent. (example: 1.44 = 1.4; 1.45 = 1.5; 1.46 = 1.5; etc.) if percentage of dockage is not given or is zero write

No Dock in the box provided or None, a diagonal slash or 0.

Grade Determining Factor - The factor (or factors) that takes the lot to its lowest grade must be identified in the boxes provided. The Grade Determining Factor maybe written out for clarity or abbreviated according to the following: T.W.= test weight; H.D.= heat damaged; T.K.D.= total kernel damage; F.M.=foreign material; S.B.= shrunken & broken; T.D.= total defects; C.C.= contrasting class; or T.W.O.C= total wheat of other classes, AF = Animal filth, CB = Castor Beans, CS = Crotalaria Seeds, GL = Glass, ST = Stones, UFS = Unknown Foreign Substance, ID =Insect Damage, and TC = Other Materials Total Count

In a grain inspection report, the total of T.K.D. + F.M. + S.B. = T.D. Total defects may not be given in the contest, but can be found (calculated) by the contestant by adding these three factors. If there is more than one factor, determining the grade, all of these factors must be listed. If the grade is U.S. No. 1, write None and/or a diagonal slash in the box provided for the grade determining factor.

Scoring - Two (2) points per box are allotted for protein percentage and dockage percentage. All other boxes are worth four (4) points each for a total of 100 points.

Failure to write the class name on the score card results in a deduction of ten (10) points. Contestants are to write "HRSW" or "Durum" or "HRSW and Durum" on the class name line.

If the lot is a sample grade as determined by the grading chart (be sure to read qualifications for this grade) write U.S. Sample or Sample in the grade box provided on the scorecard. Treated has no bearing on the U.S. grade number, it is a special grade only. Do not leave any box empty on the score card. Use a diagonal slash, the word None, 0, or use No Dock in % dockage. Samples with greater than 10% contrasting classes and wheat of other classes would be considered Mixed Wheat and will not be used in the grain grading class.

Maximum Count Limits of Other Materials

The count of other materials found in a 1000 gram sample will be given on the Market Class Grain Inspection Report card. Counts of materials such as Animal filth, Castor Beans, Crotalaria Seeds, Glass, Stones, Unknown Foreign Substances and Insect Damage per 100 grams will be given. The chart shows that counts that exceed these limits take the sample to "U.S. Sample" grade. If any one factor exceeds the count limit, it must be listed as a "Grade determining factor".

If the total count of any combination of animal filth, castor beans, crotalaria seeds, glass, stones or unknown foreign substances exceeds 4, the sample must be given the U.S. Sample grade and the grade determining factor would be "Total Count" (or T.C.). The contestant may need to add these counts to determine this factor.

E. Disorders

Ten samples will be identified according to category, causal agent and damage location. Pictures must demonstrate how the agent has affected the plant or seed.

Causal Category: Students will evaluate samples and place them in one of three possible causal categories (cultural, biological, environment).

Cultural – these are production practices taken by the producer. Examples include nutrient deficiencies, tillage practices, herbicide/pesticide application, heat damage, etc.

Biological – disorders affecting plants will be from living organisms such as fungi, viruses, bacteria, and insects

Environmental – disorders caused by Mother Nature that could include frost, wind, drought, hail, and flood.

Agents (Potential samples could include)

- Fungus – tan spot, smut, fusarium head blight (scab), fusarium root rot, downy mildew, ergot, leaf rust
- Chemical – damage from herbicide application
- Mechanical – cracked/broken kernels, plant damage from equipment
- Nematodes – soybean cyst nematode
- Viruses – wheat streak mosaic, Barley yellow dwarf
- Insect – soybean aphids, grasshoppers, cutworms, corn rootworm, European corn borer and sunflower weevils, wheat stem saw fly
- Nutritional – nitrogen, potassium and phosphorus deficiencies
- Frost Damage – damaged plant or seed

- Wind Damage – lodging of field crops
- Drought – limited moisture
- Hail – damaged plants
- Flooding – excessive moisture
- Heat – kernels that are damaged through excessive drying practices

F. Equipment Management- 100

Participants will be required to identify 20 samples from the state equipment list. Samples may appear as actual equipment, scale models, toys, or pictures. Major components that are unique to a certain piece of equipment may also be used.

| | | | |
|----|---|----|--|
| 01 | Air Compressor/hose * | 31 | Hearing protection * |
| 02 | Air Seeder (tool and air cart together) * | 32 | Hitch pin * |
| 03 | Anemometer | 33 | Hydraulic cylinder/hose * |
| 04 | Anhydrous tank (with/without applicator) | 34 | In-line ripper |
| 05 | Back pack sprayer * | 35 | Irrigation pivot |
| 06 | Bale Wagon * | 36 | Liquid manure tank/applicator (includes draglines) |
| 07 | Baler (square or round) * | 37 | |
| 08 | Fertilizer broadcast spreader (spinner or air) * | 38 | Dry Manure spreader * |
| 09 | Chemigation unit for irrigation | 39 | Moldboard plow * |
| 10 | Combine (maybe displayed with harvesting head attached) * | 40 | PPE (all equipment) |
| 11 | Combine – auger platform with reel | 41 | Press wheel |
| 12 | Combine – belt pickup head | 42 | pressure gauge * |
| 13 | Combine – corn head * | 43 | Pressure regulator |
| 14 | Combine – draper head | 44 | PTO shaft * |
| 15 | Conveyor/elevator/auger * | 45 | Rotary hoe |
| 16 | Disk – Tandem * | 46 | Row crop cultivator |
| 17 | Disk chisel | 47 | Row crop planter (air or gravity) * |
| 18 | Fertilizer density scale (dry fertilizer) | 48 | Shovel - field |
| 19 | Field cultivator/chisel plow * | 49 | Skid steer * |
| 20 | Gauge wheel | 50 | Soil probe * |
| 21 | GPS receiver | 51 | Soil sample bag |
| 22 | Grain bin/leg | 52 | Soil thermometer |
| 23 | Grain drill (press) * | 53 | Sprayer * |
| 24 | Grain dryer (not bin) | 54 | Sprayer nozzle/nozzle body * |
| 25 | Forage Harvester (may be displayed with harvesting head attached) * | 55 | Swather * |
| 26 | Harvester - potato | 56 | Sweep net |
| 27 | Harvester – sugar beets | 57 | Tensiometer |
| 28 | Hand hoe | 58 | |
| 29 | Hay mower/conditioner * | 59 | Tractor – wheeled * |
| 30 | Hay rake * | 60 | Tractor – tracked type * |

* Equipment for the Junior Division state contest will come from the list with the asterick. (30 are marked)

G. Insect Identification

Ten samples will be identified according to insect name, life cycle, economic impact and mouth part. Pictures, live specimens, or mounts will be used to identify insects. Below is the insect list

| Insect Name | Economic Impact | Life Cycle | Mouth Parts |
|--|---------------------------------|-------------------|----------------------|
| 10 Alfalfa Weevil * | V - vegetative Part Destruction | C- complete | C- chewing |
| 11 Aphids * | R - removal of plant fluids | I - incomplete | PS-piercing -sucking |
| 12 Armyworm Larva * | V - vegetative Part Destruction | C- complete | C- chewing |
| 13 Bean Leaf Beetle * | V - vegetative Part Destruction | C- complete | C- chewing |
| 14 Blister Beetle * | V - vegetative Part Destruction | C- complete | C- chewing |
| 15 Colorado Potato Beetle * | V - vegetative Part Destruction | C- complete | C- chewing |
| 16 Corn Earworm Larva * | F - Fruit/Flower Destruction | C- complete | C- chewing |
| 17 Corn Rootworm larva * | V - vegetative Part Destruction | C- complete | C- chewing |
| 18 Cricket * | F - Fruit/Flower Destruction | I - incomplete | C- chewing |
| 19 Cutworm larva * | V - vegetative Part Destruction | C- complete | C- chewing |
| 20 European Corn Borer Larva | V - vegetative Part Destruction | C- complete | C- chewing |
| 21 Flea Beetle * | V - vegetative Part Destruction | C- complete | C- chewing |
| 22 Grain Weevil * | F - Fruit/Flower Destruction | C- complete | C- chewing |
| 23 Grasshopper * | V - vegetative Part Destruction | I - incomplete | C- chewing |
| 24 Green Lacewing * | N - None or Predatory | C- complete | C- chewing |
| 25 Honeybee * | N - None or Predatory | C- complete | CL-chewing-lapping |
| 26 Japanese beetle * | V - vegetative Part Destruction | C- complete | C - chewing |
| 27 Lady Beetle Larva * | N - None or Predatory | C- complete | C- chewing |
| 28 Leafhopper * | R - removal of plant fluids | I - incomplete | PS-piercing -sucking |
| 29 Lygus | R - removal of plant fluids | I - incomplete | PS-piercing -sucking |
| 30 Salt Marsh Caterpillar (wooly worm) | V - vegetative Part Destruction | C- complete | C- chewing |
| 31 Scale | R - removal of plant fluids | I - incomplete | PS-piercing -sucking |
| 32 Spider mite * | V - vegetative Part Destruction | I - incomplete | RS- rasping-sucking |
| 33 stinkbug * | R - removal of plant fluids | I - incomplete | PS-piercing -sucking |
| 34 Tobacco/Tomato Hornworm Larva | V - vegetative Part Destruction | C- complete | C- chewing |
| 35 Western Corn Rootworm Beetle * | V - vegetative Part Destruction | C- complete | C- chewing |
| 36 Western Flower Thrip | V - vegetative Part Destruction | I - incomplete | RS- rasping-sucking |
| 37 Wheat Stem Sawfly * | V - vegetative Part Destruction | C- complete | C- chewing |
| 38 White Grub * | V - vegetative Part Destruction | C- complete | C- chewing |
| 39 Whitefly * | V - vegetative Part Destruction | C- complete | RS- rasping-sucking |
| 40 Wireworm * | V - vegetative Part Destruction | C- complete | C- chewing |

*** Insects for the Junior Division state contest will come from the list with the asterisk. (25 are marked)**

Please note that other junior contests may include any insect from the list.