

New Mexico FFA Agronomy Career Development Event

Revised: January 2021

I. PURPOSE

The Agronomy contest is designed to create interest and promote understanding in agronomic sciences by providing opportunities for student recognition through the demonstration of knowledge and skills.

II. COMMON CORE REFERENCES

7th Grade:

MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

8th Grade:

CCSS.ELA-Literacy.RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

9-10th Grade:

HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

11-12th Grade:

HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.

III. EVENT FORMAT

A. Team Make-up

Three or four individuals per school form a team. All four members will be scored, and the top three scores will count towards the team total.

B. Component Descriptions

a. General Knowledge Exam - 160 points (20 questions at 8 points each)

20 objective multiple choice questions will be given to each participant covering all agronomic practices associated with crop production. Each answer is worth eight points. Questions used will be derived from the "General Knowledge Examination" test bank as well as listed reference materials (See the References section in this document). 8 questions will be derived from the "General Knowledge Exam" test bank with the remaining 12 questions being derived from the listed reference materials.

****Note:**** questions derived from the test bank may be re-worded as long as all information from the original question is included within the re-wording!
(Answers will be recorded in Exam #1 portion of the scantron form. The Horticulture scantron will be used for the Agronomy CDE Event.)

b. Identification - 250 points (50 specimens at 5 points each)

Students will identify 20 plant specimens, 20 seed specimens, and 10 farm equipment specimens. Ideally, the plants should be live specimens and can represent any stage of development. However, press mounts or photographs can be used. Plant specimens should be equally divided between crop and weed plants. Seed specimens can be real seed samples or high-quality photographs of seeds. Seed specimens should be equally divided between crop and weed seeds. Specimens can only come from the ID lists provided. Each specimen will be worth five points.

****Note!**** Some ID lists may include scientific names which are provided to assist in finding reference materials for proper specimen identification. Students are not required to know the scientific name for any New Mexico Agronomy CDE specimen!

(Answers will be recorded in the top Identification division on the back of the scantron using 1-50. Each specimen has an assigned number on its ID list. Use these numbers for scantron answers.)

c. Placing classes - 150-300 points (a minimum of 3 classes at 50 points each with a total of 6 classes optional)

There will be a minimum of three placing classes each having four samples. Students will rank the four samples in proper order based on quality, uniformity, and shelf life of each sample. One class will be representative of each of the following categories; grain crops (seed samples), forage crops (loose or bailed hay or green chop), and fruit or vegetable crops (fruits, berries, leaves, tubers etc). Three additional (optional) placing classes will be allowed at the discretion of the contest organizer. Optional placing classes should be balanced among the previously mentioned categories. Class specimens will only be chosen from the provided "Crops ID list".

(Answers will be recorded in the placing classes portion of the scantron.)

d. Assessments and Solutions - 240 points (20 questions at 12 points each)

This section of the contest will be an activity based and questions component. The purpose of this component is to create some problems that participants will have to solve and then answer questions related to those problems. All questions will be derived from handout materials which are provided to each student during the event. Each question will be worth 12 points. There will be a maximum of 20 assessment/solution questions for the event. No more than 4 of the listed resources should be used for any one CDE Agronomy invitational event. All listed resources may be used for the Agronomy State CDE. Assessment solution questions will come from the following areas:

Soils

- soil survey reports
- soil texture/structure

Crop planting and planning

- acreage calculations
- tillage practices
- crop reports (including yield and variety assessment)
- seeding rates
- fertilizer application rates and calculations

Crop management

- herbicide labels
- insecticide labels
- irrigation rates

d. Assessment and Solutions (continued)

Materials to be used in 2020 are listed under "Assessment and Solutions" in the reference section below.

(Answers will be recorded in the Assessment and Solution portion of the scantron form.)

e. Insect Identification – 120 points (8 specimens totaling 15 points each)

This component will consist of identifying insects. Live insects, mounts, or photographs can be used. Additionally, students will have to identify characteristics related to each individual insect. Students will identify eight insects (5 points each) along with the following characteristics for each insect identified:

- a. Life cycle of each specimen (5 pts.)
- b. Mouth part (5 pts.)

(Cards must be placed at each insect specimen identifying scantron question numbers, for specimen ID, life cycle, and mouth part. Answers will be recorded in the bottom identification division on the back of the scantron form 1-24. Where, 1 through 3 are used for the first insect specimen with question 1 used for insect ID and questions 2 & 3 used for that insect's characteristics. Likewise, questions 4-6 are associated with insect #2, etc.)

IV. SCORING

General Knowledge Exam	160 points
Identification	250 points
Placing Classes	150-300 points
Assessment/Solutions	240 points
Insect Identification	120 points
Individual Score	920-1070 points
Team Score	2760-3210 points

V. TIE BREAKER

Individual ties will be broken using the following tiebreakers.

1. Highest score on the General Knowledge Exam
2. Highest score on the Identification
3. Highest score on the Assessment/Solutions
4. Highest score on the Pest Identification
5. Highest score on the Placing classes

Team ties will be broken using the following tiebreakers.

1. High Individual

-all references are listed on the following pages-

VI. REFERENCES (by component section)

General Knowledge Exam

a. Agronomy Test Bank

1. New Mexico FFA Agronomy CDE Test Bank. Download the pdf version on the New Mexico FFA website <<http://www.nmffa.org>>

(No additional questions will be added to the test bank for the 2021 CDE season.)

b. Extension Publication References (All references have been updated for 2021)

****Note: The following 8 references will be used to derive questions for the General Knowledge Exam****

1. Assassin Bugs Top the Food Web. by L. Brown, T. Vandervoet, P. Ellsworth and S. Naranjo. The University of Arizona, Arizona Cooperative Extension. 2011. pdf available at:

<<https://cals.arizona.edu/crops/cotton/files/ZelusShortvFc.pdf>>

2. Cereal Rye. Plant Fact Sheet. Prepared by Species Coordinator, USDA-Natural Resources Conservation Service, Plant Materials Program. 2002. pdf available at:

<<http://www.ars-grin.gov/databases/browse/plant/plantmaterials/pubs/2002/20020201.pdf>>

3. Cheatgrass. Plant Guide. by M. Skinner, USDA-Natural Resources Conservation Service, National Plant Data Center, Baton Rouge, Louisiana. 2008. Pdf available at:

https://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/idpmspg8317.pdf

4. White Clover. Plant Guide. by D. Ogle, USDA-Natural Resources Conservation Service, Idaho Plant Materials Center. 2009. pdf available at:

<https://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/idpmcpg8308.pdf>

5. Small Grain Forages for New Mexico. by M.A. Marsalis. New Mexico State University, Cooperative Extension Service, Circular 630. 2018. pdf available at:

<https://aces.nmsu.edu/pubs/_circulars/CR630.pdf>

6. Understanding Soil Health for Production Agriculture in New Mexico. by J. Idowu and R. Flynn. New Mexico State University, Cooperative Extension Service, Guide A-148. 2013. pdf available at:

<https://aces.nmsu.edu/pubs/_a/A148.pdf>

7. Vegetable Insects. R.E. Foster and J.L. Obermeyer. Purdue University, Purdue Extension. E-65-W. Revised 2010. Pdf available at: <<https://extension.entm.purdue.edu/publications/E-65.pdf>>

****Note**:** Students only need to know information for insects which are listed on the insect ID sheet.

8. Zinc. Agronomy Fact Sheet Series. By K. Ganoe, Q. Ketterings, and N. Herendeen. Cornell University, Cooperative Extension, Fact Sheet 32. 2007. pdf available at:

<<http://nmsp.cals.cornell.edu/publications/factsheets/factsheet32.pdf>>

Identification

a. General Plant Identification resources.

- 1. Plant Id and Information Sources.** USDA-Natural Resources Conservation Service, Technical Resources. 2020. Website available at: https://www.nrcs.usda.gov/wps/portal/nrcs/ia/technical/ecoscience/bio/NRCS142P2_008158/
- 2. Plant Identification Basics** by Mangold, J. and Parkinson, H., Montana State University Extension Service, September 2013. *pdf available at* <http://msuextension.org/publications/AgandNaturalResources/MT201304AG.pdf>.
- 3. Plant ID Basics** by Sellers, B.A., University of Florida, IFAS Extension. 2009. *Slides available at* http://weedext.ifas.ufl.edu/slides/Plant_ID_Basics/index.html.
- 4. Identifying Pasture Grasses** by Undersander, D., Casler, M., and Cosgrove, D., Cooperative Extension of the University of Wisconsin-Extension, publication-A3637. 1996. *pdf available at* <http://learningstore.uwex.edu/assets/pdfs/A3637.pdf>
- 5. Identification: Characteristics of Grasses**, Agriculture and Natural Resources, University of California. 2014. available at: <http://www.ipm.ucdavis.edu/PMG/WEEDS/ID/idcharac.html>.

b. Crops plants and seeds identification resources

- 1. Crops CDE ID power points**, Indiana 4-H Youth Development, Purdue University Extension. 2008. available at: <http://www.four-h.purdue.edu/cde/crops.cfm>.
(PowerPoint slides showing several specimens of crop plant and seed id and weed plant and seed id. Slides highlight distinguishing characteristics.)
- 2. Cucurbit Seed Production, An organic seed production manual for seed growers in the Mid-Atlantic and Southern U.S.**, Carolina Farm Stewardship Association, 2005. available at: <http://www.carolinafarmstewards.org/wp-content/uploads/2012/05/CucurbitSeedProductionver1.4.pdf>.
(This resource covers cucumber, pumpkins, and squash. It includes information about plant and seed characteristics. It also shows photos and gives information about several of the insects on the Agronomy insect list.)
- 3. Forage Identification Pages**, Purdue University, Department of Agronomy, Agronomy Extension, 2007. available at: <http://www.agry.purdue.edu/ext/forages/ForageID/forageid.htm> .
(Covers stem, leaf, flower, and seed characteristics for alfalfa, Ladino clover, sweet clover, red clover, orchardgrass, tall fescue, timothy, and sudangrass.)
- 4. Seed ID Workshop**, The Ohio State University, Ohio Agricultural Research and Development Center. 2009. available at: <http://www.oardc.ohio-state.edu/seedid> .
(photos for about half of the crops seed id specimens.)

c. Weeds plants and seeds identification resources

1. Weeds of the West (Fifth Edition) by Larry C. Burrill, Steven A. Dewey, David W. Cudney, B. E. Nelson, Tom Whitson, Tom D. Whitson, L. C. Burrill. Paperback, 630 Pages, Published 1996.

(This is a great book describing the majority of the weed species in the west. It usually has a couple of photos and descriptive plant characteristics.)

2. Weed Id Pages, Weeds Society of America. 2014. available at: <http://wssa.net/weed/weedidentification/weed-id-pages>.

(This resource lists all the university weed identification websites. Follow the listings under "Agronomic Crop Weeds". You will find plenty of weed id resources at this one site.)

3. Weed Information, New Mexico State University, Weed Science. 2014. available at: <http://weeds.nmsu.edu>.

4. Troublesome Weeds of New Mexico by Ashigh, J., Wanstall, J., and Sholedice, F. New Mexico State University, Cooperative Extension Service. 2010. available at: <http://bit.ly/nmweeds> pdf available at: http://aces.nmsu.edu/pubs/weeds/docs/troublesomeweedsnm_small.pdf

d. Entomology Insect Identification resources

1. Who Let the Bugs Out?: A Beginner's Guide to Managing Radical Insects by Timothy J. Gibb. Purdue University, 2013. available at: <http://extension.entm.purdue.edu/radicalbugs/default.php?page=home>.

2. One Hundred Common Insects of New Mexico by Richman, David B., Sutherland, Carol A., and Oseto, Y., New Mexico Cooperative Extension Service, November 1993. <http://aces.nmsu.edu/pubs/circulars/CR570.pdf>

3. Indiana 4-H Entomology, Insect Flashcards, Purdue University Extension. 2011. available at: http://extension.entm.purdue.edu/4hyouth/pdf/Flashcards_web.pdf.

(Great resource containing photos and descriptive information for most of the NM Agronomy listed insects.)

4. A Field Guide to Common Texas Insects, Texas A&M University, Department of Entomology. 2012. available at: <http://texasinsects.tamu.edu>.

(Insects are sorted by scientific nomenclature "Order". Photos and description of most of the NM Agronomy listed insects.)

5. Insect Diagnostic Laboratory, Cornell Cooperative Extension, College of Agriculture and Life Sciences at Cornell University. available at: <http://idl.entomology.cornell.edu/factsheets>.

(This resource does not include a lot of the listed insects, but for the ones it does have an entire pdf factsheet is dedicated to them.)

6. Insect Images, Center for Invasive Species and Ecosystem Health. The University of Georgia. 2010. available at: <http://www.insectimages.org>.

(This resource has an extensive photo database for most any insect imaginable. This is primarily a photo site and does not include descriptive information.)

e. Equipment

There are no reference resources for this portion of the Agronomy CDE. A simple Google search for the items on the equipment list will provide the student with plenty of images and information for each equipment specimen.

Assessment and Solution

Assessment and solution practicum questions will come from several sources (1 through 7 listed below) and will be handed out to each student at the event. Questions will be derived from the resources listed below in a scenario format. For example, a web soil survey, including crop production information, can be used along with the seeding rates resource. Likewise, a field management scenario using the nutrient management, Herbicide, and Insecticide resources. There will be a maximum of 20 assessment/solution questions for the event.

a. Practicum resources

For reference only. Do not use in CDE event.

Web Soil Survey by Foster, J., Gates, D., Albrecht, G., Czymmek, K., and Ketterings, Q. Cornell University Cooperative Extension. Fact Sheet 52. 2010. *pdf available at:* <http://nmsp.cals.cornell.edu/publications/factsheets/factsheet52.pdf>

(This is a nice tutorial on the use of the web soil survey)

2020 Assessment and Solution Resources

1. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. **Web Soil Survey**. [April 9, 2019]. *available at:* <https://websoilsurvey.sc.egov.usda.gov>.
****Note**:** *Cut and past the URL into a web browser. Hyperlinking will not work with this address.*
2. **Calculating Fertilizer Costs**. By R. Flynn, New Mexico State University, Cooperative Extension Service, Guide A-133. Revised December 2014. Pdf available at: https://aces.nmsu.edu/pubs/_a/A133.pdf
3. **Calibrating Drills and Broadcast Planters for Small-Seeded Forages**. by J. Jennings, University of Arkansas, Division of Agriculture, Research and Extension. FSA3111. 2019. Pdf available at <https://www.uaex.edu/publications/PDF/FSA-3111.pdf>
4. Extension Pesticide Applicator Training Series #3 **Treatment Area Measurements**. by R.C.Runyan, Revision by J.B Pierce, New Mexico State University, Cooperative Extension Service, Guide A-612, November 2019. *pdf available at:* https://aces.nmsu.edu/pubs/_a/A612.pdf
5. Extension Pesticide Applicator Training Series #5: **Calculating Pesticide Amounts for Broadcast Applications**. by J.B. Pierce and J. French, New Mexico State University, Cooperative Extension Service, Guide A-614, May 2016. *pdf available at:* https://aces.nmsu.edu/pubs/_a/A614.pdf
6. **Understanding Pure Live Seed (PLS)**. by Duvauchelle, D. 2014. USDA-Natural Resources Conservation Service, Hoolehua Plant Materials Center, Hoolehua, Hawaii. TN - Plant Materials 03. *pdf available at:* https://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/hipmctn12338.pdf
7. **Pursuit Herbicide Label**. BASF Corporation 2017. pdf available at: <http://www.cdms.net/ldat/ld01S006.pdf>