



IOWA

FFA ASSOCIATION

**AG BIOTECHNOLOGY
Career Development Event**

This is a Skills CDE

Table of Contents

<u>Section</u>	<u>Page</u>
General Skills Career Development Event Rules	2
Overview	4
AFNR Content Standards	4
Event Rules	5
Event Format	5
Event Resources	6
Scoring	6
Awards	7
Event Materials	7

**1055 SW Prairie Trail Pkwy
Ankeny, IA 50023
P: 515-965-7376
F: 515-965-7373
iowaffa.com**

**AG SKILLS CAREER DEVELOPMENT EVENT
GENERAL POLICIES, RULES, RESULTS AND STANDARDS**

***Violations of any of the following rules may be grounds for the disqualification of the participants.**

I. Board Policies

The following board policies (<http://www.iowaffa.com/ffaboardpolicies.aspx>) apply directly or in part to Skills CDEs:

- Board Policy #2: Changes in Judging Event Answer Keys
- Board Policy #3: Changes to Judging Event Results
- Board Policy #11: Substitution of Team Members
- Board Policy #25: Advancement of Teams to National FFA Competition
- Board Policy #27: Use of Electronic Storage/Transmission Devices

II. Eligibly of Chapters and Participants

1. Each state event is open to all FFA chapters in good standing with the Iowa FFA Association. (Exception: Soils Career Development Event is open to the top five teams from each district competition.)
2. Local FFA advisors or their designee entering teams in the state event must register their intent to have a team on Iowa FFA On-Line (<http://anfmp01.dmac.edu/fmi/webd#>) by the due dates and registration fees listed below:
 - a. Before 14 days prior the event No Charge
 - b. Between 14 days prior and day of the event \$50.00An invoice will be sent to the chapter for the appropriate entry fees at the end of the season.
3. A chapter may enter a separate team in each event held on a particular day. However, no member may participate in more than one Ag Skills Career Development Event on a particular day.
4. After an FFA Advisor registers the chapter's intent to enter a team, the names of the team members are expected to be entered on the Iowa FFA On-Line (<http://anfmp01.dmac.edu/fmi/webd#>) by noon three days prior to the event. Any member not listed on Iowa FFA On-Line will need to be registered as an FFA member using the National FFA MyFFA Account (<https://www.ffa.org>). Changes to online entries may be made the day of the event. State and National FFA Dues will be invoiced in accordance with Iowa FFA Association policies and by-laws.
5. A participant, at the time of his/her participation in the state event and selection as a national team member, must:
 - a. Be a current bona fide dues paying FFA member in good standing with the local chapter, state FFA Association and the National FFA Organization at the time of the career development event in which he/she participates.
 - b. Be a middle school or high school FFA member, (a graduating senior is considered eligible to compete in state and national career development events up to and including their first national convention following graduation). Middle school refers to students in grades 7-8 and high school refers to students in grades 9-12.
 - c. Have been enrolled in high school Agricultural Education during the current/most recent school year with the following exceptions: Meats, Livestock, Dairy Cattle and Milk Quality & Products-must have been enrolled the previous school year or be in grades 8-12 for the current year.
 - d. Currently be an active FFA member of the chapter making entry into the event.
6. A member may not participate in both a state 4-H and state FFA Career Development Event when said events are held on the same day.
7. Participation in one Ag Skills Career Development Event of its type will not exclude an active FFA member from participating in the future Ag Skills Career Development Event, if the participant still qualifies as a middle school or high school FFA member (Rule 5b) providing he/she was not on a state championship FFA CDE team or a national FFA participant in the said event.
8. No student may participate in more than one Career Development Event each year at the national level.

9. For the Soils Career Development Event, each district FFA advisor must email all results including a list of participants for each of the top five teams to the State FFA Executive Director within one business day of the district event.

III. Event Room Conditions

10. Any communication, verbal or non-verbal between participants during a career development event will be sufficient cause to eliminate the team member involved from the career development event. The only exception to this would be communication between team members during the team activity portion of a given career development event.
11. Any assistance given to a team member from any source other than the career development event officials or assistants will be sufficient cause to eliminate the team from the career development event.
12. No extra FFA members or other persons are permitted to view the state event until the completion of the event. The only people allowed in the event area during the event are participants and designated event workers. Observers and FFA advisors who are not working with the event will not be permitted in the event area while the event is in progress. The following are exceptions to this rule: the presentation portions of the Marketing Plan CDE and Ag Communications CDE at the Iowa FFA Leadership Conference.

IV. Participant Assignments

13. Each participant will be given an individual ID number by which he/she will be designated throughout the event. Contestant badges with identification numbers may be issued.
14. Teams will be divided into groups for individual activities. When possible, groups will be assigned to avoid having two participants on the same team in the same group.
15. Each participant will work on an individual basis throughout the event except during the FFA chapter team activity. Each team will submit one score card or product per team for the team activity.

V. Equipment and Dress Code

16. Participants are urged to bring and use clipboards during events to facilitate the holding of placing and grading cards. The clipboards are to be clean and free of markings. A few sheets of blank paper will be permitted for taking notes and recording results.
17. Calculators may be used with the FFA Career Development Events. They must be battery or solar operated, non-programmable and silent, unless otherwise listed in the specific Career Development Event rules.
18. Items needed for specific phases of each Career Development Event will be noted under their specific rules.
19. Participants are expected to observe the National FFA Code of Ethics and the Proper Use of the FFA Jacket during the career development events found in the Official FFA Manual (<https://www.ffa.org/about/who-we-are/official-manual>).
20. Official FFA dress is expected for all participants when appropriate. If official dress is not appropriate, official casual dress should be worn. Official casual dress shall consist of 1) FFA t-shirt or polo shirt and 2) khaki or nice denim pants or shorts.

VI. Event Results

21. In the event that ALL participants' scores are incorrect the board reserves the right to correct the results.
22. Each FFA advisor will receive the judging cards, score cards, answer sheets and results following a career development event and the presentation of awards. FFA advisors are not permitted to pick up event packets until after the awards presentation.

VII. AFNR Career Cluster Content Standards

AFNR Content Standards are specifically outlined within each respective Skills CDE.

Ag Biotechnology

2019 Chairperson: Renee Thompson, West Branch

Coordinators: Leah Sandall and Stacie Turnbull, University of Nebraska-Lincoln

Committee Personnel: Eric Kumm, Paullina & Tom Boeck, Central Lee

I. Overview

The purpose of the agricultural biotechnology career development event is to encourage FFA members to explore the diversity of the Biotechnology Industry, in terms of basic knowledge, skills and applications of biotechnology to the work place. The areas of agricultural biotechnology have important implications for the animal, plant, food, and pharmaceutical industries. The event requires students to identify materials and tools common to the industry, demonstrate knowledge and understanding of scientific principles and management practices applied in the industry via a written exam, and make observations, draw conclusions and make decisions in evaluating aspects of biotechnology principles.

II. AFNR Content Standards

BS.01. Standard: NCAE Standard: Assess factors that have influenced the evolution of biotechnology in agriculture (e.g., historical events, societal trends, ethical and legal implications, etc.).

BS.01.02. Indicator: Evaluate the scope and implications of regulatory agencies on applications of biotechnology in agriculture and protection of public interests (e.g., health, safety, environmental issues, etc.).

BS.03. Standard: NCAE Standard: Demonstrate the application of biotechnology to solve problems in Agriculture, Food and Natural Resources (AFNR) systems (e.g., bioengineering, food processing, waste management, horticulture, forestry, livestock, crops, etc.).

BS.03.01. Indicator: Apply biotechnology principles, techniques and processes to create transgenic species through genetic engineering.

BS.03.02. Indicator: Apply biotechnology principles, techniques and processes to enhance the production of food through the use of microorganisms and enzymes.

BS.03.03. Indicator: Apply biotechnology principles, techniques and processes to protect the environment and maximize use of natural resources (e.g., biomass, bioprospecting, industrial biotechnology, etc.).

BS.03.04. Indicator: Apply biotechnology principles, techniques and processes to enhance plant and animal care and production (e.g., selective breeding, pharmaceuticals, biodiversity, etc.).

BS.03.05. Indicator: Apply biotechnology principles, techniques and processes to produce biofuels (e.g., fermentation, transesterification, methanogenesis, etc.).

BS.03.06. Indicator: Apply biotechnology principles, techniques and processes to improve waste management (e.g., genetically modified organisms, bioremediation, etc.).

BS.02. Standard: NCAE Standard: Demonstrate proficiency by safely applying appropriate laboratory skills to complete tasks in a biotechnology research and development environment (e.g., standard operating procedures, record keeping, aseptic technique, equipment maintenance, etc.).

BS.02.01. Indicator: Read, document, evaluate and secure accurate laboratory records of experimental protocols, observations and results.

BS.02.02. Indicator: Implement standard operating procedures for the proper maintenance, use and sterilization of equipment in a laboratory.

BS.02.03. Indicator: Apply standard operating procedures for the safe handling of biological and chemical materials in a laboratory.

BS.02.04. Indicator: Safely manage and dispose of biological materials, chemicals and wastes according to standard operating procedures.

BS.02.05. Indicator: Examine and perform scientific procedures using microbes, DNA, RNA and proteins in a laboratory.

CRP.04. Standard: Communicate clearly, effectively and with reason.

CRP.04.01. Indicator: Speak using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.

CRP.04.02. Indicator: Produce clear, reasoned and coherent written and visual communication in formal and informal settings.

III. Event Rules

- A. Teams will consist of three to four members. All members will be scored and the top three scores, in each event area, will count towards the team total.
- B. It is highly recommended that participants wear FFA Official Dress for this event.
- C. During the practicum portion of the event, all team members will work together.
- D. Team members may utilize computers for the practicum portion of the event. Any team members utilizing the computers in any way not required for the contest is subject to disqualification.
- E. Any participant in possession of a cell phone in the event area is subject to disqualification. A tablet, iPad or computer may be used in the practicum area only.
- F. This is a district qualifying event. Two teams will qualify from each district. (Not applicable in Iowa)

IV. Event Format

Each year, the biotechnology CDE committee will release event specifications for the following year. The specifications will outline the topical area to be addressed for the practicum portion of the event, as well as specific training materials.

- A. **Equipment Needed:** Students **must provide** pencils and ONE tablet, iPad or computer per group. **Not a cell phone.**
- B. **Event Schedule:**
 1. Each contestant shall complete the event in the time allotted:
 - a. The identification of materials and tools must be completed in 30 minutes.
 - b. The practicum section must be completed in 60 minutes.
 - c. The written examination must be completed in 30 minutes.
 2. Observers are not permitted in the event area while the event is in progress.
- C. **Written Test:** (150 points/individual; 450 points/team)
 1. The written test is designed to evaluate participants' knowledge in biological concepts related to the biotechnology industry. The test will consist of a 50 question exam.
 2. Test may be presented in either computer or bubble format.
 3. Students must provide a pencil for the written test.
 4. Scratch paper will be provided.
 5. Students will have 30 minutes to complete this section. Participants will be allowed to work at their own pace.
- D. **Practicum:** (75 points/individual; 300 points/team)
 1. This practicum is designed to evaluate participants' ability to evaluate a problem set using information provided. The practicum may include a combination of the following:
 - a. Utilizing biological information.
 - b. Research (onsite) a situation relevant to the biotechnology industry.
 - c. Determining supporting facts in solving the situation.For the practicum portion of the contest, team members will be asked to find and distill information, utilizing resources provided, rather than memorize information.
 2. Research recourses and blank paper will be provided.
 3. Students will have 60 minutes to complete this section. Contestants will be allowed to work at their own pace.
 4. Students will work on the practicum and put together a written presentation of their results. The visual will be evaluated for the practicum score.

- E. Identification of Materials and Tools: (25 points/individual; 75 points/team)
1. Twenty-five specimens will be selected from the 56 materials and tools listed on the identification list.
 2. Specimens will be identified on an individual basis, with 30 minutes.
 3. Materials and tools to identify will be presented as intact specimens, models, or high quality photographs.
 4. Each specimen will be designated with a number. Students fill in the answer sheet in the space next to the specimen's name on the official scorecard.
 5. One point will be given for each correctly identified specimen.
 6. Under no circumstances is any student allowed to touch or handle the photos or specimen used as part of the event. Any infraction of this policy is sufficient cause to eliminate the individual from the entire contest. Any contestant looking at the identification form of another contestant will be automatically disqualified.

V. Event Resources

The Biotechnology App will be a key resource for preparing for the Biotechnology CDE: <https://ge.unl.edu/journey-of-a-gene/>, <https://ge.unl.edu/enviropig/>, <https://ge.unl.edu/oomycete/>. Each of these scenarios are similar. However, the differing scenarios may be helpful to students of different backgrounds. Pay attention to the “test your knowledge” section for identification and prior written exams and practicums.

The event has ties to the following agricultural science curriculum: Introduction to Agriculture, Food and Natural Resources 11000; Animal Biology 11004; Plant Science 11007; Horticulture 12000; Plant Biology 11016; Natural Resources 13000; Biotechnology 12004; Nursery and Landscape 12001; Food Science 14000; Advanced Food Science 14001; Agronomic Science 11008; Agriculture 115 (<http://agronomy.unl.edu/agri115-biotech>).

VI. Scoring

- A. Participants will be ranked in numerical order on the basis of the final score to be determined by each judge without consultation. The judge's ranking of each participant then shall be added, and the winner will be that participant whose total ranking is the lowest. Other placing will be determined in the same manner (low point method of selection). Weighted rank scoring will be implemented to maintain point value emphasis between individual and team events.

	<u>Individual Points</u>	<u>Team Points</u>
Written Test (50 questions @ 3 points each)	150	450
Team Practicum (1 scenario @ 300 points)	75	300
Identification (25 specimens @ 1 point each)	25	75
Total Points Possible	250	825

B. Tiebreakers

1. Team tiebreakers will be settled in the following order:
 - a. Practicum score
 - b. Combined individual test scores
 - c. Combined individual identification scores
2. Individuals tiebreakers will be settled in the following order:
 - a. Test score
 - b. Identification score
 - c. Practicum score

VII. Awards

Awards Sponsored through the Iowa FFA Foundation

Champion Team	Plaque
Reserve Champion Team	Plaque
Top 10 Teams	Rosettes
Members of Top 10 Teams	Rosettes
Top 10 Individuals	Rosettes
1 st and 2 nd Place Individuals	Plaques
Top Team and Top Individual	Plaques
a. Written Test	
b. Practicum	
c. Identification	
All Teams/Individuals	Certificates

All awards subject to available sponsorship.

If the Top Individual enrolls in the College of Agriculture at Iowa State University they will receive a \$500 Scholarship from ISU.

VIII. Event Materials

Identification list

- | | | |
|---------------------------------|-----------------------|----------------------------------|
| 1. DNA | 20. Microscope Slides | 39. Nucleus |
| 2. Micro-Pipet Tips | 21. Microscope | 40. Cell wall |
| 3. DNA strand | 22. Hot plate | 41. Chromosomes |
| 4. Micropipetter | 23. Balance Scale | 42. Loading Gel Electrophoresis |
| 5. Electrophoresis casting tray | 24. Sepal | 43. Mortar and pestle |
| 6. Water Bath | 25. Anther | 44. Punnett square to predict F2 |
| 7. Electrophoresis | 26. Filament | 45. Punnett square to predict F1 |
| 8. Agar gel | 27. Stamen | 46. Gene gun |
| 9. Beaker | 28. Pistil | 47. Gene gun ammunition |
| 10. Graduated cylinder | 29. Style | 48. Pollen |
| 11. Protein test strip | 30. Stigma | 49. Tissue Culture Plant |
| 12. Forceps | 31. Ovary | 50. Detasseling crew |
| 13. Thermal cyclor | 32. Ovule | 51. Pollinating stigmas |
| 14. Petri dish | 33. Silk | 52. Removing Anthers |
| 15. Incubator | 34. Tassel | 53. Transgene design |
| 16. Micro-Centrifuge Tubes | 35. Pollen | 54. Hybrid Seed Production field |
| 17. Centrifuge | 36. Tassel bag | 55. Genetic material structure |
| 18. Hand planter | 37. Shoot bag | 56. Isolated DNA |
| 19. Pipet Tips | 38. Central Vacuole | |