



IOWA

FFA ASSOCIATION

AG MECHANICS

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	6
Event Format	7
Event Information	7
Event Themes	8
Scoring and Ranking of Teams and Individuals	8
Awards	9
Event Materials	9

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 to the event | No Charge |
| b. Between 14 days prior and day of the event | \$50.00 |

An 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. Accommodations for participants can be made upon request of the FFA Advisor. The accommodation form must be submitted no less than 14 days prior to the respective event.
11. 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.
12. 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.
13. 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

14. 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.
15. 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.
16. 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

17. 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.
18. Calculators may be used with the Career Development Events. They must be battery or solar operated, non-programmable and silent, unless otherwise listed in the specific Career Development Event rules.
19. Items needed for specific phases of a Career Development Event will be noted under their specific rules.
20. 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>).
21. 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

22. In the event that ALL participants' scores are incorrect the board reserves the right to correct the results.
23. 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.

Agricultural Mechanics

2020 Chairpersons: Jon Davis, Gilbert and Jim Green, St. Ansgar

Coordinators: Dr. Mark Hainline, Iowa State University

Committee Personnel: Jim Lundberg, Charles City; Jim Fitzgerald, Boone

Scoring Coordinator: Jason Carolan, State Center

I. Overview

- A. To motivate high school Agricultural Education students to develop understandings and learn skills in the following content areas:
 1. Electrical Systems – AC/DC power, electrical safety, electrical standards, sensing devices, electrical wiring, controls, electronics, motors and other electrical loads, operating instructions, and manufacturer’s recommendations.
 2. Environmental/Natural Resource Systems – water quality, sustainable agricultural practices, soil and water conservation, biological waste handling.
 3. Energy Systems – mechanical power, chemical power, wind power, solar power, hydraulic power, engine operation, maintenance, trouble-shooting, repair.
 4. Machinery and Equipment Systems – repair and maintenance, materials handling, processing, adjustments, metal fabrication.
 5. Structural Systems – structures, storage, concrete, masonry, plumbing, electrical, fabrication, construction, building materials, ventilation, heating, air conditioning.
- B. To develop hands-on performance operations in agricultural mechanics.
- C. To develop the ability to gather information and solve problems related to agricultural mechanics.
- D. To develop the ability to follow safety practices in all agricultural mechanics activities.
- E. To obtain knowledge and skills in agricultural mechanics, which will be helpful in future careers related to agricultural mechanics.
- F. To develop interpersonal and teamwork skills.

II. AFNR Content Standards

ABS.04. Standard: Develop a business plan for an AFNR business.

ABS.04.01. Indicator: Analyze characteristics and planning requirements associated with developing business plans for different types of AFNR businesses.

ABS.04.02. Indicator: Develop production and operational plans for an AFNR business.

AS. 05 Standard: Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.

AS.05.01 Indicator: Design animal housing, equipment and handling facilities for the major systems of animal production.

AS.05.01.01. a. Awareness Measurement: Differentiate between the types of facilities needed to house and produce animal species safely and efficiently.

AS.08. Standard: Analyze environmental factors associated with animal production.

AS.08.01.01. c. Advanced Measurement: Devise a plan that includes measures to reduce the impact of animal agriculture on the environment.

AS.08.02. Indicator: Evaluate the effects of environmental conditions on animals and create plans to ensure favorable environments for animals.

ESS.02. Standard: Evaluate the impact of public policies and regulations on environmental service system operations.

ESS.02.01. Indicator: Interpret and evaluate the impact of laws, agencies, policies and practices affecting environmental service systems.

ESS.03. Standard: Develop proposed solutions to environmental issues, problems and applications using scientific principles of meteorology, soil science, hydrology, microbiology, chemistry and ecology.

ESS.03.01. Indicator: Apply meteorology principles to environmental service systems.

- ESS.03.02. Indicator:** Apply soil science and hydrology principles to environmental service systems.
- ESS.03.03. Indicator:** Apply chemistry principles to environmental service systems.
- ESS.03.04. Indicator:** Apply microbiology principles to environmental service systems.
- ESS.03.05. Indicator:** Apply ecology principles to environmental service systems.
- ESS.04. Standard:** Demonstrate the operation of environmental service systems (e.g., pollution control, water treatment, wastewater treatment, solid waste management and energy conservation).
- ESS.04.01. Indicator:** Use pollution control measures to maintain a safe facility and environment.
- ESS.04.02. Indicator:** Manage safe disposal of all categories of solid waste in environmental service systems.
- ESS.04.04 Indicator:** Compare and contrast the impact of conventional and alternative energy sources on the environment and operation of environmental service systems.
- ESS.04.04.01. b. Intermediate Measurement:** Assess the advantages and disadvantages of conventional energy sources in regard to environmental service systems.
- ESS.05. Standard:** Use tools, equipment, machinery and technology common to tasks in environmental service systems.
- ESS.05.01. Indicator:** Use technological and mathematical tools to map land, facilities and infrastructure for environmental service systems.
- ESS.05.02. Indicator:** Perform assessments of environmental conditions using equipment, machinery and technology.
- NSR.01 Standard:** Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions to natural resource issues and goals.
- NRS.01.01.02. a. Awareness Measurement:** Summarize the components that comprise all ecosystems.
- NRS.01.06. Indicator:** Apply ecological concepts and principles to living organisms in natural resource systems.
- NRS.02. Standard:** Analyze the interrelationships between natural resources and humans.
- NRS.02.01. Indicator:** Examine and interpret the purpose, enforcement, impact and effectiveness of laws and agencies related to natural resource management, protection, enhancement and improvement (e.g., water regulations, game laws, historic preservation laws, environmental policy, etc.).
- NRS.02.01.01. a. Awareness Measurement:** Distinguish between the types of laws associated with natural resources systems.
- NRS.02.02.01.b. Intermediate Measurement:** Assess and explain how different kinds of human activity affect the use and availability of natural resources (i.e., agriculture, industry, transportation, etc.).
- NRS.03. Standard:** Develop plans to ensure sustainable production and processing of natural resources.
- NRS.03.01. Indicator:** Sustainably produce, harvest, process and use natural resource products (e.g., forest products, wildlife, minerals, fossil fuels, shale oil, alternative energy, recreation, aquatic species, etc.).
- NRS.03.02. Indicator:** Demonstrate cartographic skills, tools and technologies to aid in developing, implementing and evaluating natural resource management plans.
- NRS.04. Standard:** Demonstrate responsible management procedures and techniques to protect, maintain, enhance, and improve natural resources.
- NRS.04.01. Indicator:** Demonstrate natural resource protection, maintenance, enhancement and improvement techniques.
- PS.03. Standard:** Propagate, culture and harvest plants and plant products based on current industry standards.
- PS.03.05. Indicator:** Harvest, handle and store crops according to current industry standards.
- PST.01. Standard:** Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power, structural and technical systems.
- PST.01.01. Indicator:** Apply physical science and engineering principles to assess and select energy sources for AFNR power, structural and technical systems.
- PST.01.02. Indicator:** Apply physical science and engineering principles to design, implement and improve safe and efficient mechanical systems in AFNR situations.

PST.01.02. 02.a. Awareness Measurement: Identify the tools, machines and equipment needed to construct and/or fabricate a project in AFNR.

PST.02. Standard: Operate and maintain AFNR mechanical equipment and power systems.

PST.02.01. Indicator: Perform preventative maintenance and scheduled service to maintain equipment, machinery and power units used in AFNR settings.

PST.02.02. Indicator: Operate machinery and equipment while observing all safety precautions in AFNR settings.

PST.03. Standard: Service and repair AFNR mechanical equipment and power systems.

PST.03.01. Indicator: Troubleshoot, service and repair components of internal combustion engines using manufacturers' guidelines.

PST.03.01.01. a. Awareness Measurement: Identify and classify components of internal combustion engines used in AFNR power, structural and technical systems.

PST.03.01.02. b Awareness Measurement: Utilize technical manuals and diagnostic tools to determine service and repair needs of spark-and-compression internal combustion engines used in AFNR power, structural and technical systems.

PST.03.02. Indicator: Service electrical systems and components of mechanical equipment and power systems using a variety of troubleshooting and/or diagnostic methods.

PST.03.01.02. a. Awareness Measurement: Distinguish the characteristics of spark-and-compression internal combustion engines used in AFNR power, structural and technical systems.

PST.04. Standard: Plan, build and maintain AFNR structures.

PST.04.01. Indicator: Create sketches and plans for AFNR structures.

PST.04.01.01. b. Intermediate Measurement: Apply scale measurement and dimension to develop sketches of agricultural structures.

PST.04.02. Indicator: Determine structural requirements, specifications and estimate costs for AFNR structures

PST.04.03. Indicator: Follow architectural and mechanical plans to construct, maintain and/or repair AFNR structures (e.g., material selection, site preparation and/or layout, plumbing, concrete/masonry, etc.).

PST.05. Standard: Use control, monitoring, geospatial and other technologies in AFNR power, structural and technical systems.

PST.05.01. Indicator: Apply computer and other technologies (e.g., robotics, CNC, UAS, etc.) to solve problems and increase the efficiency of AFNR systems.

PST.05.02. Indicator: Prepare and/or use electrical drawings to design, install and troubleshoot electronic control systems in AFNR settings.

PST.05.03. Indicator: Apply geospatial technologies to solve problems and increase the efficiency of AFNR systems.

III. Event Rules

- A. Each school may enter a team composed of three or four participants, with the three highest scores counting for the team total score. Team members must all be from the same chapter.
- B. Each participant will participate in all phases of the event.
- C. A chapter may enter 1, 2, 3, or 4 participants; however, to be eligible for the state team winner, a chapter must enter a team of at least 3 participants.
- D. Each participant will work on an individual basis throughout the event.
- E. Participants must supply and wear Industrial Quality Eye Protection spectacles (Style B), or goggles during the skill phases of the event. Coveralls or a shop coat may be worn during the skill phase of the event. Appropriate footwear is required. (Work boots or work shoes recommended. No sandals or cloth shoes are allowed.) All students are expected to arrive with the proper Personal Protective Equipment including Welding helmets, gloves and jackets.
- F. Participants shall report to the chair of the event by 8:30 a.m. on the event day. Registration and parking information will be provided prior to event day.

- G. Answer sheets, worksheets and other written materials will be furnished for each event phase.
- H. Each student should bring a clipboard for the written exam portions of the event.

IV. Event Format

Two types of activities will be included in the Ag Mechanics event. These include: A) individual problem-solving/skill development activities and B) written exam questions.

- A. Individual Problem-Solving/Skills - This phase will consist of the completion of activities relating to each of the five instructional areas listed in “Event Information”.
- B. Written Examination - the exam will consist of a total of 75 multiple-choice questions over the five instructional areas mentioned above (15 questions per content area.)
- C. Safety - Each participant must supply all personal safety equipment including proper footwear as specified in rules. No participants will be allowed to participate in the skill phase unless they have and wear INDUSTRIAL QUALITY EYE PROTECTION: SPECTACLES (STYLE B) or GOGGLES. Eye protection will not be available at the event site.
- D. Event Time - Each participant will complete the following areas in the event. The basic areas are:
 - 1. Problem-Solving/Skill Activity - Electricity (15 minutes)
Written Exam – Electricity (15 minutes)
 - 2. Problem-Solving/Skill Activity – Environmental & Natural Resource (15 minutes)
Written Exam – Environmental & Natural Resource (15 minutes)
 - 3. Problem-Solving/Skill Activity – Machinery and Equipment (15 minutes)
Written Exam – Machinery and Equipment (15 minutes)
 - 4. Problem-Solving/Skill Activity – Metals & Welding (15 minutes)
Written Exam – Metals & Welding (15 minutes)
 - 5. Problem-Solving/Skill Activity – Structures (15 minutes)
Written Exam – Structures (15 minutes)

V. Event Information

- A. Suggested internet web site links for the Iowa FFA Agricultural Mechanics event will be posted as soon as they are available at the Iowa FFA Association website (www.iowaffa.com) and emailed to all Iowa Ag Education Teachers by January 1st.

- B. The themes for future National FFA Agricultural Mechanics Career Development Events include:

2020 - Integrated Pest Management (IPM)

2021 - Animal Production System

2022 - Materials Handling Systems

2023 - Processing Systems

2024 - Plant Production Systems

Each year, a theme will be identified, as well as the topic emphasis for each of the five ag mechanics content problem-solving/skill activity areas.

- C. **2020** Event Information

- 1. Theme - The theme for the **2020** Iowa FFA Agricultural Mechanics Career Development Event will be **“Integrated Pest Management (IPM).”** All activities of the event will relate to this theme.
- 2. Instructional Areas – The **2020** event will cover the following instructional areas:
 - a. Electrical Systems – Electrical Wiring - Switches
 - b. Environmental & Natural Resources Systems – Land Measurement
 - c. Machinery and Equipment Systems – Machinery-Sprayers
 - d. Metals & Welding – MIG Welding
 - e. Structural Systems – Carpentry

VI. Event Themes:

CDE AREA	2020	2021	2022	2023	2024
Theme:	Integrated Pest Management	Animal Production	Materials Handling	Processing Systems	Plant Production
Electrical Systems	Electrical Wiring-Switches	Electrical Wiring-Outlets	Electrical Wiring-Switches	Electrical Wiring-Switches	Electrical Wiring-Outlets
Environmental/Natural Resource Systems	Land Measurement	Land Measurement	Soil & Water Management	Land Measurement	Soil & Water Management
Machinery and Equipment Systems	Machinery-Sprayers	Machinery-Skid Loaders	Small Engines	Machinery-Tractors	Small Engines
Metals and Welding	MIG Welding	MIG Welding	Arc Welding	MIG Welding	Arc Welding
Structural Systems	Carpentry	Carpentry	Concrete	Carpentry	Plumbing

VII. Scoring and Ranking of Teams and Individuals

<u>Phases</u>		<u>Total Possible</u>
Written Examination (15 questions on each area below)	1 point per question	75
Skill Activity: Electrical Systems		25
Skill Activity: Environmental/Natural Resources Systems		25
Skill Activity: Machinery & Equipment Systems		25
Skill Activity: Metals and Welding		25
Skill Activity: Structural Systems		25
Total Individual Points Possible		200

Total Team Score Top 3 Individuals 600

- A. For teams and individuals, ties will be broken first by the total written exam score and second by the total individual problem-solving/skill development score.
- B. For determining the top team in each content area, the top three scores for each content area will be used to determine the top team. For determining the team rankings overall, each team’s top three individual scores will be added together to determine that team’s total score.
- C. Teams will be ranked into groups designated “Gold,” “Silver,” and “Bronze.” Only the top three team members’ scores will count for team score. The top three scores will count in each division or category regardless of overall individual ranking used in computing the overall team score. All team members are eligible for individual awards. Teams which violate any rule will receive a “Participation” rating.

VIII. Awards

Awards Sponsored through the Iowa FFA Foundation

Champion Team	Cash Award for Travel to National Convention
Reserve Champion Team	Plaque
Top 10 Teams	Rosettes
Members of Top 10 Teams	Rosettes
Top 10 Individuals	Rosettes
1st and 2nd Place Individuals	Plaques
Top Team/Individual Written Exam	Plaques
Skill Activity Top Team/Individual	Plaques
Electrical Systems	
Environmental/Natural Resources Systems	
Machinery & Equipment Systems	
Metals & Welding Systems	
Structural Systems	
All Teams/Individuals	Certificates

All awards subject to available sponsorship.

IX. Event Materials