

ARKANSAS FFA AGRICULTURAL TECHNOLOGY and MECHANICAL SYSTEMS CAREER DEVELOPMENT EVENT

I. Purpose

The Agricultural Technology and Mechanical Systems Career Development Event recognize students with agricultural technology and mechanical systems competencies important to the modern workplace. The technical content and required skills continue to include all traditional areas of agricultural technology and mechanical systems. Additionally, the operation of modern equipment, the application of new management strategies and the mastering of advanced technologies are increasingly emphasized. This career development event selects and awards those students and teams that demonstrate: (1) mastery of the subject matter skills common to the systems areas; (2) superior problem solving techniques; (4) an understanding of modern technology; (5) the ability to function as individuals to complete mechanical practicums.

II. Event Rules and Format

A. Team Make-Up

Teams will consist of four members. All four team members' scores will count towards the teams total score. Teams having fewer than three members are not eligible for team awards, but students may receive individual awards.

B. Equipment

1. Needed-Safety Materials Students Must Provide.

Each event participant must adhere to the safe practices and work habits appropriate when performing required activities. Participants are responsible and must provide all personal safety equipment including:

- a. **Industrial-quality eye protection: INDIVIDUALS MUST WEAR STYLE B (SEE BELOW) INDUSTRIAL-QUALITY EYE PROTECTION** during the skill/problem solving activities. Those with prescription eyewear that is not Style B must also wear safety glasses or goggles while participating in this event. Safety glasses do not have to be worn while completing the written exam. Acceptable spectacles or goggles must adhere to the American National Standard Practice for Occupational and Education Eye and Face Protection, Z87.1-1979 (or Z87.1-1968) and revisions approved by ANSI. Description of style A, B, and C Industrial Quality Eye Protection are as follows:

- i. **Style A: NOT ACCEPTABLE** for use in the event. These are safety spectacles without side shields. They are for limited-hazard use requiring only frontal protection. The addition of accessory side shields that are not firmly secured does not upgrade style A to a style B or C.
- ii. **Style B: ACCEPTABLE**-Safety spectacles with wire mesh, perforated plastic or non-perforated side shields. The side shields shall be tapered, with an anatomical periphery extending at least half-way around the circumference of the lens frame. Industrial-quality eye protection for those not wearing prescription glasses shall be Style B.

- iii. **Style C: NOT ACCEPTABLE** for use in the event. Safety spectacles with semi-or flat-fold shield that must be firmly secured to the frame. Style C glasses do not provide maximum protection from the top and bottom angles.
- b. **Clothing:** Each individual shall furnish and wear appropriate clothing such as long pants and long sleeved cotton shirt, coveralls, etc. for this event. Clothing must be in good repair and fit properly. Oversized or loose fitting clothing is dangerous around agricultural equipment and is not allowed. Long-sleeves must be worn when welding or oxy-fuel cutting. No open-toed footwear shall be worn during the event.
- c. **Other Material:** Each participant must have a clipboard, two sharpened No. 2 pencils and an electronic calculator. Calculators used in this event should be battery operated and silent. A tool list will be provided 10 days prior to the contest date for any other specialized tools and or equipment that will need to be provided by the contestant for the contest.
- d. Necessary equipment such as helmets, shields, gloves, welding leathers hearing protection devices, etc., will be furnished by the individuals FFA chapter.
- e. Tools for the specified areas will be furnished by the individuals FFA chapter.

C. Individual Activities

1. Written Examination

Each student completes an examination that consists of 50 problem solving/multiple choice questions. Test questions will only come from the possible Practicum Areas listed for Even and Odd years. A list of chapters from the listed resources will be provided to prepare for the exam. Students will have 60 minutes to complete this portion of the career development event.

2. Problem solving

Each student will complete a problem solving portion for each of the skill areas (4).

Each team member will complete 1 practicum from the following lists. Practicums for District Contest will come from the District Agriculture Mechanics Practicum Resource Document. Please use this resource to prepare your team for district contests. All possible activities can be found in the District Agriculture Mechanics Practicum Resource Document.

- Even Years: Arc Welding
Woodworking
Plumbing
Graphics
Tool Sharpening
Ag Electrification
- Odd Years: Cold Metalwork
Surveying
Concrete/Masonry
Small Engines
Oxyacetylene
Farm Power

Scoring

Phase	Individual Points Possible	Team Points Possible
Examination	150	600
Skill	160	640
<u>Problem Solving</u>	<u>40</u>	<u>160</u>
TOTAL	350	1400

Curriculum Resources

Agricultural Mechanics: Fundamental and Applications by Herrin and Cooper

ALL YEARS:

- Unit 1: Mechanics in the World of Agriculture
- Unit 2: Career Option in Agricultural Mechanics
- Unit 3: Shop Orientation & Procedures
- Unit 4: Personal Safety in Agricultural Mechanics
- Unit 5: Reducing Hazards in Agricultural Mechanics
- Unit 6: Shop Cleanup & Organization

Even Years:

Arc Welding

- Unit 26: Selecting & Using Arc Welding Equipment
- Unit 27: Arc Welding Mild Steel & GMAW/GTAW Welding

Woodworking

- Unit 7: Hand Tools, Fasteners, & Hardware
- Unit 8: Layout Tools & Procedures
- Unit 9: Selecting, Cutting, and Shaping Wood
- Unit 10: Fastening Wood
- Unit 11: Finishing Wood
- Unit 14: Portable Power Tools
- Unit 15: Woodworking with Power Machines
- Unit 16: Adjusting & Maintaining Power

Plumbing

- Unit 37: Plumbing
- Unit 38: Irrigation Technology
- Unit 39: Hydraulic, Pneumatic, & Robotic Systems

Graphics

- Unit 18: Sketching & Drawing Projects
- Unit 19: Figuring a Bill of Materials
- Unit 20: Selecting, Planning, & Building a Project

Tool Sharpening

- Unit 21: Repairing & Reconditioning Tools
- Unit 22: Sharpening Tools

Ag Electrification

- Unit 33: Electrical Principles & Wiring Materials
- Unit 34: Installing Branch Circuits
- Unit 35: Electronics in Agriculture
- Unit 36: Electric Motors, Drives, & Controls

Odd Years:

Cold Metalwork

- Unit 12: Identifying, Marking, Cutting, & Bending Metal
- Unit 13: Fastening Metal
- Unit 17: Metalworking with Power Machines

Surveying

Concrete/Masonry

- Unit 40: Concrete & Masonry

Small Engines

- Unit 30: Fundamentals of Small Engines
- Unit 31: Small Engine Maintenance & Repair
- Unit 32: Diesel Engines & Tractor Maintenance

Oxyacetylene

- Unit 23: Using Gas Welding Equipment
- Unit 24: Cutting with Oxyfuels & Other Gases
- Unit 25: Brazing & Welding w/Oxyacetylene

Farm Power

Introduction to Agricultural Engineering Technology by Field and Sollie

ALL YEARS:

1. Problem Solving
2. Significant Figures & Standard Form
3. Common Units of Measure

Even Years:

Arc Welding

Woodworking

Plumbing

Graphics

Tool Sharpening

Ag Electrification

Chapter 25: Principles of Electricity

Chapter 26: Series & Parallel Circuits

Chapter 27: Sizing Conductors

Chapter 28: Electric Motors

Odd Years:

Cold Metalwork

Surveying

Chapter 12: Measuring Distance

Chapter 13: Land Description

Chapter 14: Land Description

Chapter 15: Differential & Profile Leveling

Chapter 16: Weather

Chapter 17: Water Runoff

Chapter 18: Erosion & Erosion Control

Chapter 19: Irrigation

Chapter 20: Handling, Moisture Management, & Storage of Biological Products

Chapter 21: Animal Waste Management

Chapter 22: Insulation & Heat Flow

Chapter 23: Heating, Ventilation, & Air-Conditioning

Concrete/Masonry

Small Engines

Oxyacetylene

Farm Power

Chapter 4: Simple Machines

Chapter 5: Internal Combustion Engines

Chapter 6: Power Trains

Chapter 7: Tractors & Power Units

Chapter 8: Machinery Calibration

Chapter 9: Equipment Efficiency & Capacity

Chapter 10: Economics of Agricultural Machinery

Chapter 11: Sound & Noise