

PURPOSE: The Agricultural Mechanics CDE selects and awards those students and teams that demonstrate: (1) mastery of the subject matter and skills common to the systems areas; (2) effective communication skills; (3) superior problem solving techniques; (4) an understanding of modern technology; (5) the ability to function as individuals and as team members working together.

Eligibility: This event is open to all middle school FFA chapters and members in good standing. This event will be held during the Thursday of Delaware FFA June CDE week with the high school agriculture mechanics CDE.

Event Procedures:

A. Team Make-Up

Teams will consist of four members. Team ranking is determined by combining the scores of the four students from each team. Individual ranking is determined by Tool/Parts ID and Measuring Skills.

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 team activity and the measurement activity. 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 identification. 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. Descriptions 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 halfway 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 senior 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 FFA t-shirt 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.
- c. **Other Materials:** Each participant must have a clipboard, two sharpened No. 2 pencils and a non-programmable electronic calculator. Calculators used in this event should be battery operated and silent.

2. **Tools:** Bring all tools that are needed to complete the team activity components. Tools will be provided for the measurement component.

Event Format: The Middle School FFA Agricultural Mechanics Career Development Event is divided into four systems areas. Each system includes a broad range of information and performance skills common to agricultural technology and mechanical systems.

1. Machinery and Equipment Systems: repair and maintenance, materials handling, processing, adjustments, metal fabrication
2. 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
3. Energy Systems: mechanical power, chemical power, wind power, solar power, hydraulic power, engine operation, maintenance, trouble-shooting, repair
4. Structural Systems: structures, storage, concrete, masonry, plumbing, electrical, fabrication, construction, building materials

Team:

Teams will divide their team amongst the 4 categories (1 member per category) to complete the activity.

1. Machinery and Equipment Systems- simple metal working activity with hand tools only
2. Electrical Systems- wire a simple 12V circuit
3. Energy Systems- measure the spark plug gap
4. Structural Systems- using provided map of fields and developments, correctly label the areas

Individual

1. Parts/Tool ID: 25 tools/parts from the approved Tool ID list. 4 pts each

2. Measuring: 20 measuring problems appropriate to the included instructional areas.

SCORING:

		Team Score (660pts)	Individual Score (140pts)
(1) Team Activity		100pts	0pts
Machinery and Equipment Systems	25pts		
Electrical Systems	25pts		
Energy Systems	25pts		
Structural Systems	25pts		
(4) Individual			
Tool/Parts ID (25@4pts)	100pts	400pts	100pts
Measuring Skills (20@2pts)	40pts	160pts	40pts

TIE BREAKERS: The team activity scores will be used to break a tie associated with the team rankings. If a tie still exists, the combined written exam scores will be used to break the tie. The Tool/Parts ID individual scores will be used to break a tie associated with the individual rankings. If a tie still exists, the Measuring Skills will be used to break the tie.

AWARDS: Awards will be presented to individuals and/or teams based upon their rankings at the State Fair FFA Awards Breakfast.

REFERENCES: This list of references is not intended to be all-inclusive. Other sources may be utilized, and teachers are encouraged to make use of the very best instructional materials available. The following list contains references that may prove helpful during event preparation.

1. National FFA Core Catalog—Past CDE Material (<http://shop.ffa.org/cde-qas-c1413.aspx>)
2. Information specific to each annual event is available on the National FFA Agricultural Technology and Mechanical Systems Career Development Event web page CEV Multimedia. LTD.
3. Agricultural Engineering Technology. (ASABE) Springer Science + Business Media, LLC.
4. Mechanics in Agriculture. Prentice Hall.
5. Agricultural Mechanics Fundamentals and Applications. Delmar and Thompson
6. Modern Agricultural Mechanics, V3. Prentice Hall.
7. Developing Shop Safety Skills. American Association for Vocational Instructional Materials.
8. Power Tool Safety and Operation. Hobar Publications.
9. Practical Farm Buildings. Prentice Hall.
10. National Electrical Code (latest edition). NFPA.
11. Ag Wiring Handbook. Rural Electricity Resource Council.
12. Mechanical Technology in Agriculture. Prentice Hall.
13. Industry websites
14. Tool/Parts ID list (see appendix)

Tool/Part ID (Identification may be the actual tools or pictures of the tools listed below)

1	Adjustable combination square	51	Miter box
2	Adjustable hack saw	52	Monkey wrench
3	Adjustable wrench (crescent)	53	Nail puller
4	Allen wrench	54	Nail Set
5	Awl (scratch)	55	Nippers, adjustable jaw
6	Ball peen hammer	56	Offset screwdriver
7	Bit brace	57	Open end box wrench
8	Bit, Auger	58	Open-end wrench (set)
9	Bit, Phillips Screwdriver	59	Phillips screwdriver
10	Bit, Spade	60	Pipe cutter
11	Bit, Standard Screwdriver	61	Pipe wrench
12	Bit, Twist Drill	62	Plane, block
13	Bolt cutter	63	Pliers, Vise Grip
14	Box or rack for twist drills	64	Pocket slide calipers
15	C clamp	65	Protractor
16	Calipers, inside	66	Protractor head
17	Calipers, outside	67	Putty knife
18	Carpenter level	68	Rasp, wood
19	Center punch	69	Ratchet box wrench
20	Clamp, Bar	70	Rip saw
21	Clamp, Block	71	Rivet cutter
22	Claw hammer, curved	72	Rivet hammer
23	Claw hammer, ripping	73	Round file
24	Cold chisel	74	Rule, Folding Wood
25	Combination slip-joint, side cutting pliers	75	Saw, coping
26	Compass saw	76	Scraper
27	Countersink	77	Screwdriver
28	Crosscut saw	78	Sliding tee bevel square
29	Diagonal cutting pliers	79	Socket extension

30	Dividers
31	Draw knife
32	Electric drill
33	Expansion bit
34	Feeler gauge
35	File, half-round
36	File, Square
37	File, Triangular
38	Flat file
39	Flexible steel rule
40	Framing square
41	Glass cutter
42	Hand drill
43	Jack plane
44	Linemen's side cutting pliers
45	Mallet (rawhide facing)
46	Mallet, Wooden
47	Marking Gauge
48	Metal vise
49	Meter Stick
50	Micrometer calipers

80	Socket ratchet
81	Sockets (12 point)
82	Soldering copper
83	Steel tape
84	Tap and drill gauge
85	Tap and reamer wrench
86	T-Square
87	Twelve-point box wrench
88	Vice grip wrench
89	Welder's chipping hammer
90	Wood chisel
91	Wrecking bar
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