

***AGRICULTURAL MECHANICS  
CAREER DEVELOPMENT EVENT***

*RULES AND REGULATIONS*

*TEAM COMPETITION*



*ALABAMA FFA ASSOCIATION*

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Alabama State Department of Education, Dr. Eric G. Mackey, State Superintendent of Education

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**Agricultural Mechanics CDE**

# AGRICULTURAL MECHANICS CAREER DEVELOPMENT EVENT

## PURPOSE

This event is designed to recognize those students who have developed the competencies necessary for success in the changing workplace. The knowledge and skills of the technical content of agricultural mechanics will always remain important to the industry. This career development event will have a balance between a problem-solving focus performed by individuals working together as a team and individual knowledge and problem-solving/skill performance.

## ELIGIBILITY AND REGULATIONS

- For specific eligibility of participants, refer to the Contest and Awards Booklet.
- Only district eliminations will be held prior to the state event.
- The top four winners in the North, Central and South Districts will compete in the state finals.
- If a cell phone or smart watch is seen or heard in the possession of a competitor, that individual student will be disqualified from competition and receive a score of zero.
- Competitors must enter their **first and last name** as well as their **chapter number and name** on the scorecard or they will receive a score of zero. Judges will not attempt to figure out who the card belongs to.
- Scantrons cards that are incorrectly completed (i.e. chapter numbers are not correctly shaded in, stray marks, etc.) will not be scored thus receiving a score of zero.
- The team will consist of a maximum of four members. The team's total score will be based on the sum of the points earned by the three highest scoring participants on the team.

## DISCLAIMER

If contests (CDE, LDE, TDE's) cannot be held in person, a virtual option may be conducted. Contest rules and guidelines are subject to change to meet the needs of a virtual experience.

## DRESS CODE

Participants must wear closed toed shoes/boots (no sandals, crocs or slides) and long pants (jeans with no holes/ khakis/dress pants) or skirts (for religious reasons) that cover the knees if not in official dress. Leggings, jogging pants, yoga, lycra, are not permitted. Shirts should be long enough to be tucked in (no crop tops or midriff showing) and not contain vulgar or suggestive material or language. Contest where oral reasons are given should respect the professionalism of the event, and dress aligning with the profession is preferred. Official FFA Dress is an allowable **form of dress for all events. Consequences for not being in dress code will result in disqualification, and the participant will not be allowed to compete.**

## ALTERNATE POLICY

For district level events, if a chapter brings alternates there will be no more than two alternates allowed per team. Alternates will use a copy of the scan form (not an original) for those events scored via judgingcard.com. If more than four official scan forms are turned in for a chapter in one event, the highest score(s) for that team will be disqualified and deleted until the chapter only has four team members in the scoring system. Alternates must not be in groups with official team members.

For state level events, alternates are not allowed.

## INSTRUCTIONAL AREA

The career development event will be developed from the following subject matter areas that are listed following each of the five systems associated with the agricultural mechanics industry.

1. Machinery and Equipment: repair and maintenance, materials handling, processing, adjustments, metal fabrication
2. Electricity: 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. Compact Equipment: Mechanical power, electrical power, hydraulic power, engine operation, maintenance, troubleshooting, repair
4. Structures: Structures, storage, concrete, masonry, plumbing, electrical, fabrication, construction, building materials, ventilation, heating, air conditioning.
5. Environmental and Natural Resources: Water quality, sustainable agricultural practices, soil and water conservation, surveying, biological waste handling

Based on the selected event, competencies concerning the subject areas in each of the systems should be identified in preparation for the Agricultural Mechanics Career Development Event. Instructors will select related competencies from the list included in this resource.

## DISTRICT EVENT

1. The teams completing in the district events will be composed of a maximum of four members. The three highest scores will make up the team.
2. District Eliminations will consist of two phases.

**WRITTEN EXAMINATION** - This phase will consist of 75 multiple choice questions in the selected subject matter areas. Participants will have 40 minutes to complete 75 questions. [One (1) point per question, for a possible of 75 points.]

**PROBLEM SOLVING** - This phase will consist of identifying materials or solving problems related to the subject matter areas. Each participant will have 40 minutes to complete 25 problems. [Three (3) points per problem, for a possible 75 points.]

- **The problem-solving portion of the contest will be reviewed by at least 2 state staff and/or district improvement specialists and/or industry representatives**

**prior to the contests in order to ensure that answers are correct and properly aligned with the questions.**

3. Electronic calculators are allowed and encouraged.
4. The team with the highest combined score in the problem-solving phase will be placed highest. The second tie breaker will be the team that has the highest score on written exam. The third tie breaker will be the high individual in the problem solving. (new)

## STATE EVENT

1. The state event will be held during the State FFA Convention. The team will consist of a maximum of four members. The team's total score will be based on the sum of the points earned by the three highest scoring participants on the team.
2. Additional information will be mailed to the district winners prior to the state finals.
3. Electronic calculators are allowed and encouraged.
4. State finals will consist of two phases:

**PROBLEM SOLVING** - This phase will consist of identifying materials or solving problems related to the subject matter areas. Each participant will have 40 minutes to complete 25 problems. [Three (4) points per problem, for a possible 100 points.]

- **The problem-solving portion of the contest will be reviewed by at least 2 state staff and/or district improvement specialists and/or industry representatives prior to the contests in order to ensure that answers are correct and properly aligned with the questions.**

**SKILL DEVELOPMENT ACTIVITIES** - Each participant is individually evaluated in each of the five systems areas. The specific activities occurring in each event are not publicized prior to the event. Each student is allowed 20 minutes to complete each of the five activities (100 minutes total).

ODD YEARS	EVEN YEARS
<b>Machinery and Equipment</b>	
Parts Identification	Calculating draft
Calculate HP requirements	Reading manuals for specifications
Basic Hydraulic principles	Determining proper implement
<b>Electricity</b>	
ID of electrical tools	Electric Motor badging
Electrical motor wiring	Installation of single leg 120v circuits
Wire three-way switches	Using a VOM/Muti-meter
<b>Compact Equipment</b>	
Engine Part ID	Examine and diagnose faults
Use manual to lookup specifications	Check engine specifications
Use measurement tools to check tolerance	Replace pull rope assembly
<b>Structures</b>	

Stick Welding - butt, lap, or tee joint	Wire welding - butt, lap, or tee joint
<b>Environment &amp; Natural Resources</b>	
Calculate application rate or volume	Use transit level
Use piping to build pump supply system	Find area of area
Calculate GPM from running pump	Calculate capacity and volume

5. In the event of a tie, In the event of a tie, the team with the highest combined score in the problem-solving phase will be placed highest. The second tie breaker will be the team that has the highest score in the team activity. The third tie breaker will be the high individual in the problem solving.
6. Each participant will be responsible for personal safety equipment which includes industrial quality eye protection devices (spectacles or goggles).
7. Clothing - Each participant shall furnish and wear coveralls, a shop coat, or uniform for this event. Long sleeve clothing *must* be worn when arc welding or cutting.

### EVENT SCORING (District Event)

The following is an outline of the event scoring for each individual team member and team activity:

<b><u>WRITTEN EXAMINATION</u></b> - 75 questions	
1 point per question-----	75
<b><u>PROBLEM SOLVING</u></b> - 25 problems	
3 points per question	75
TOTAL POINTS ( <i>per individual</i> )	150
TOTAL TEAM POINTS (3 participants)	450

### EVENT SCORING (State Event)

The following is an outline of the event scoring for each individual team member and team activity:

<b><u>PROBLEM SOLVING</u></b> - 25 questions.	
4 point per question	100
<b><u>INDIVIDUAL PROBLEM SOLVING/SKILLS DEVELOPMENT –</u></b>	
Five (5) Individual Problem Solving/Skills Development Activities at 30 points each.	150
TOTAL TEAM POINTS ( <i>3 participants</i> )	750

The first-place team will represent Alabama in the National Finals. (Should the first-place state team be unable to participate in the National Finals, then the next place team may go instead. In such a case, awards will be exchanged to take care of traveling expenses for the team).

## REFERENCES

This list of references is not intended to be inclusive. Other sources may be utilized, and teachers are encouraged to make use of the very best instructional materials available. The goal of the FFA Agricultural Mechanics Career Development Event is to guide and promote quality instructional programs in agricultural mechanics. The following list contains references that may prove helpful during event preparation. The multiple-choice test questions are written to be generic in nature and are selected from a variety of sources. It is the intent of the event committee to reflect current technological practices, common to the agricultural production industry.

FOS. John Deere.

FOM John Deere

Agricultural Power and Machinery. (CD format) CEV Multimedia. LTD.

Mechanics in Agriculture. Interstate Publishers.

Agricultural Mechanics Fundamentals and Applications.  
Delmar Publishers.

Modern Agricultural Mechanics, Interstate Printers and  
Publishers.

Developing Shop Safety Skills. American Association for  
Vocational Instructional Materials.

Power Tool Safety and Operation. Hobar.

Agricultural Mechanics I Lesson Plans. UMC-IML.

Agricultural Mechanics II Lesson Plans. UMC-IML.

Agricultural Buildings and Structures. Reston Publications.

Practical Farm Buildings. Interstate Publishers.

National Electrical Code (latest edition). NFPA.

Agricultural Structures, Volumes I and II. UMC-IML.

National FFA Agricultural Mechanics web site:  
<http://web.missouri.edu/~pavt0689/natcon.html>

Differential GPS Explained, by Jeff Hurn, Trimble Navigation Ltd.  
645 North Mary Avenue, P.O. Box 3642, Sunnyvale, CA 94088

GPS - A Guide to the Next Utility, by Jeff Hurn, Trimble Navigation Ltd.  
645 North Mary Avenue, P.O. Box 3642 Sunnyvale, CA 94088

Getting Started with Geographic Information Systems  
(ISBN: 0-13-923889-1) by Keith C. Clarke, 2<sup>nd</sup>. edition, 1999.

Prentice Hall, Upper Saddle River, NJ 07458

The GPS Manual - Principles and Applications  
(ISBN: 0-917893-29-8) by Steve Dye with Dr. Frank Baylin, 1<sup>st</sup> edition, 1997.  
Baylin Publications, 1905 Mariposa, Boulder, CO 80302

The Precision Farming Guide for Agriculturists  
Textbook (ISBN: 0-86691-245-2)  
Instructors Guide (ISBN: 0-86691-263-0)  
Deere & Company, John Deere Publishing TIAC Building, 1300 19<sup>th</sup> Street, East Moline, IL  
61244

Environmental Science for Agriculture and the Life Sciences  
(ISBN: 0-8273-5025-2) by William G. Camp & Roy L. Donahue,  
Delmar Publishers, Inc., 3 Columbia Circle, Box 15-015, Albany, NY 12212-5015

Environmental Science Ecology and Human Impact  
(ISBN: 0-201-46889-1) by Bernstein, Winkler, Zierdt-Warshaw, 2<sup>nd</sup> edition

Environmental Science, Addison-Wesley Publishing Company  
by DuBay, Lapinski, Schoch, Tweed, 3<sup>rd</sup> edition,  
(ISBN: 0-201-32134-3) Scott Foresman-Addison Wesley Longman, Inc.  
New York, NY

Applying Pesticides Correctly: A Guide for Private and Commercial Applicators. U.S.  
EPA, USDA and Extension Service, revised 1991.

Applying Pesticides Correctly: A Supplemental Guide for Private Applicators. U.S. EPA,  
USDA and Extension Service, December 1993, Publication E-2474.

The Worker Protection Standard for Agricultural Pesticides - How to Comply: What  
Employers Need to Know. U.S. EPA, July 1993, Publication EPA 735-B-93-001.

Turner, J. H. (1987). Small Engines: Operation Maintenance and Repair. American  
Association for Vocational Instructional Materials. Tab Books Inc.

Cooper, E. L. (1987). Agricultural Mechanics: Fundamentals and Applications. Delmar  
Publishers Inc.

Instruction Book. Push Mower. Murray Model 20111x78A

Repair Manual for Single Cylinder 4-Cycle Engines. Briggs & Stratton Corp.

## TEAM TABULATION SHEET (District)

### AGRICULTURAL MECHANICS CAREER DEVELOPMENT EVENT

CHAPTER \_\_\_\_\_

Participant	Participant Number	Event Phase	Participant Score	Participant Total
Name of Participant # 1				



		Written Exam (75 points)	
		Problem Solving (75 points)	
Participant # 1's Total (Maximum score possible is 150 points.)			

Name of Participant # 2		Written Exam (75 points)	
		Problem Solving (75 points)	
Participant # 2's Total (Maximum score possible is 150 points.)			

Name of Participant # 3		Written Exam (75 points)	
		Problem Solving (75 points)	
Participant # 3's Total (Maximum score possible is 150 points.)			

Name of Participant # 4		Written Exam (75 points)	
		Problem Solving (75 points)	
Participant # 4's Total (Maximum score possible is 150 points.)			

TEAM RANKING		TOTAL TEAM SCORE (The three highest individual participant scores will make up the team score. Maximum score possible is 450 points.)	
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**TEAM TABULATION SHEET (State)**  
**AGRICULTURAL MECHANICS**  
**CAREER DEVELOPMENT EVENT**

CHAPTER \_\_\_\_\_

Participant	Event Phase	Participant Score	Participant Total
Name of Participant 1	Problem Solving (100 pts.):		
	Problem/Skill 1 (30 pts.):		
	Problem/Skill 2 (30 pts.):		

	Problem/Skill 3 (30 pts.):	
	Problem/Skill 4 (30 pts.):	
	Problem/Skill 5 (30 pts.):	
	<b>Participant # 1's Total</b>	<b>(Maximum score possible is 250 points.)</b>
Name of Participant 2	<b>Problem Solving (100 pts.):</b>	
	Problem/Skill 1 (30 pts.):	
	Problem/Skill 2 (30 pts.):	
	Problem/Skill 3 (30 pts.):	
	Problem/Skill 4 (30 pts.):	
	Problem/Skill 5 (30 pts.):	
	<b>Participant # 2's Total</b>	<b>(Maximum score possible is 250 points.)</b>
Name of Participant 3	<b>Problem Solving (100 pts.):</b>	
	Problem/Skill 1 (30 pts.):	
	Problem/Skill 2 (30 pts.):	
	Problem/Skill 3 (30 pts.):	
	Problem/Skill 4 (30 pts.):	
	Problem/Skill 5 (30 pts.):	
	<b>Participant # 3's Total</b>	<b>(Maximum score possible is 250 points.)</b>
Name of Participant 4	<b>Problem Solving (100 pts.):</b>	
	Problem/Skill 1 (30 pts.):	
	Problem/Skill 2 (30 pts.):	
	Problem/Skill 3 (30 pts.):	
	Problem/Skill 4 (30 pts.):	
	Problem/Skill 5 (30 pts.):	
	<b>Participant # 4's Total</b>	<b>(Maximum score possible is 250 points.)</b>
<b>TEAM RANKING</b>		<b>TOTAL TEAM SCORE</b> (The three highest individual participant scores will make up the team score. Maximum score possible is 750 points)