

AGRICULTURAL MECHANICS

The Agricultural Technology and Mechanical Systems Career Development Event (CDE) helps students develop technical knowledge and an ability to work with others to solve complex agricultural problems. The event is built around students learning and executing a “systems approach” – or the process of understanding how solving one problem influences others.

Individuals complete a written exam that covers five agricultural technology and mechanical areas: compact equipment, electricity, environment and natural resources, machinery and equipment and structures.

Students and teams that perform the highest in this CDE demonstrate a mastery of systems areas subject matter, effective communication skills, superior problem-solving techniques and an understanding of modern technology.

RULES AND REGULATIONS

1. The score of the 3 high individuals on each team will be used to determine the team score.
2. Members are not required to wear Official dress.
3. The CDE will be developed from the following subject matter listed for each of the three subject matter areas:
 - a. **AGRICULTURAL POWER AND MACHINERY**
 - b. **AGRICULTURAL ELECTRIFICATION & SMALL POWER**
 - c. **AGRICULTURAL CONSTRUCTION**
4. Each contestant must participate in the following events:
 - a. Skill activities will be outlined in September (see below for past rotational system outline). Manufacture model will be released in March of the CDE Year. Each contestant will complete one or more specific hands-on performance operation(s) in a time period of 25 minutes for each operation within each of the 3 subject areas.
 - b. Written Examination will cover all subject matter areas as identified by the skill areas using the last three years of National Exams. Each contestant will have 60 minutes to complete 25 multiple choice and/or 5 problem solving questions.
5. The CDE will be conducted as follows:

Written examination	60 minutes
Agricultural Power and Machinery	50 minutes
Skills (25 minutes each)	
Agricultural Electrification and Power	50 minutes
Skills (25 minutes each)	
Agricultural Construction	50 minutes
Skills (25 minutes each)	

6. Contestants will be evaluated on performance in each of the following activities:

Written examination	50 points
Performance Skills at 50 points per area	<u>150 points</u>
TOTAL	200 points

The team standing will be based on 600 possible points earned by three contestants.

5. Each year Contest Coordinators will work with state staff to create an outline based around our three areas of content. This outline will be released in September of each year.

6. State Staff will select from the past three years of National Machinery options to best fit our industry and programs. Power options will be Identified from the small, medium, large tractor power areas. The machinery option for the upcoming year will be released with the outline in September.
7. Safety:
Industry values personnel who demonstrate safe attitudes and practices, individual and cooperative teamwork, high order thinking skills and problem solving, as well as the basic technical competencies associated with work.

Each contestant must follow recommended practices and work habits appropriate for the assigned activities.

- Any Contestant who fails to follow safety practices will be removed from that area of event receiving a zero for contestants score. Contestant may rejoin in next rotation.
- Second Safety offense will equal in removal from event completely with a zero score.

Each contestant will be responsible for all personal safety equipment, example: safety glasses, welding helmet, welding gloves, welding jacket, welding chipping hammer, brush, etc.

8. Past rotation system below will be used as an example for the CDE, to include the following subject areas:

2018-19

a. AGRICULTURAL POWER AND MACHINERY

Tractor Power (75-200HP)
Agricultural Machinery and Equipment - Baler

b. AGRICULTURAL ELECTRIFICATION

Electric Circuits: Install a single pole, 3-way, switch loop and switch duplex receptacle.
Electric Power (motors)

c. AGRICULTURAL CONSTRUCTION AND SOIL & WATER CONSERVATION

Gas Cutting: Cut mild steel including pipe.
Soil and Water Conservation (Farm leveling)

2019-20

a. AGRICULTURAL POWER AND MACHINERY

Tractor Power (75-200HP)
Ag Machinery and Equipment – Grain Drill

b. AGRICULTURAL ELECTRIFICATION

Electrical Circuits: Wiring procedures, switches and safety devices
Small Engine Power

c. AGRICULTURAL CONSTRUCTION AND SOIL & WATER CONSERVATION

Metal Fabrication (Arc Welding)
Repair and Maintenance (Twist drill sharpening)

2020-21

a. AGRICULTURAL POWER AND MACHINERY

Tractor Power (75-200HP)
Agricultural Machinery and Equipment – Pull type forage Harvester

b. AGRICULTURAL ELECTRIFICATION

Electrical Circuits: Wire a sub panel with breakers, and 240 outlet.
Electric Power: Motors

c. **AGRICULTURAL CONSTRUCTION AND SOIL & WATER CONSERVATION**

Metal Fabrication: Mig welding basic joints (butt, lap, t-fillet, vertical up, vertical down, horizontal bead and multiple pass t-fillet) using mild steel or flux core electrode

Plasma Cutting: Cut mild steel including pipe

AGRICULTURAL POWER AND MACHINERY

1. Tractor Power
 - a. Identify external parts of the tractor.
 - b. Problem solving according to manufacturer's specifications
2. Agricultural Machinery
 - a. Identify the parts of the current year's identified machine.
 - b. Adjust and/or calibrate machinery.

AGRICULTURAL ELECTRIFICATION and SMALL POWER

1. Electrical Circuits (every year)
 - a. Install a single pole, 3-way, switch loop and switch duplex receptacle.
 - b. Wire a sub panel with breakers, and 240 outlet.
2. Electric Motors (even year's)
 - a. Interpret motor nameplate data.
 - b. Identify motors and parts.
3. Small Engine Power (odd year's)
 - a. Identify parts of a small engine.
 - b. Troubleshoot, evaluate electrical, governor and carburetion parts.

AGRICULTURAL CONSTRUCTION AND SOIL AND WATER CONSERVATION

1. Repair and Maintenance
 - a. Recondition hand tools such as twist drills, chisels and screw drivers.
 - b. Plumbing: Identify pipe, valves and fitting type.
2. Soil and Water Conservation
 - a. Set up and level the instrument.
 - b. Record field notes for differential leveling.
3. Metal Fabrication
 - a. Arc weld basic joints (butt, lap, t-fillet, vertical up, vertical down, horizontal bead and multiple pass t-fillet) using E6011, E6010 or E7018 electrode at least 1/4" metal.
 - b. Mig welding basic joints (butt, lap, t-fillet, vertical up, vertical down, horizontal bead and multiple pass t-fillet) using mild steel or flux core electrode.
 - c. Gas Cutting: Cut mild steel including pipe.
 - d. Plasma Cutting: Cut mild steel including pipe.