

**Home Lab Advantage: Build It. Bring It. Boast of It.**

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### **Introduction/need for innovation or idea**

The purpose of the Team Activity of the Agriculture Mechanics Career Development Event (CDE) is to provide an opportunity for contestants to work cooperatively to solve a problem, document the work in a report, and have a finished product. A total team score is summed from the three components (National FFA Organization, 2024).

The Agriculture Mechanics CDE in Arizona is conducted at the University of Arizona. The event consists of five individual skill activities, five individual problem-solving activities, and a Team Activity. Four students make up the FFA Chapter team. Traditionally, the Team Activity is conducted at the beginning of the state CDE followed by the individual activities. Due to facility limitations, number of teams, contestants, and time frame, the Team Activity is conducted outside on a lawn area is limited to 30-45 minutes. The activity has been conducted as two rotations (up to 12 teams per rotation) with 20 minutes per rotation. Depending on the actual activity, materials, (such as lumber, PVC pipe, irrigation tubing) are pre-cut and sorted. Teams may be instructed to provide their own tools (hand or battery-powered, no power cords). Construction activities are limited to 45 minutes. While contestants are sorted for individual skills, the team activity projects are evaluated. A comment we frequently heard after each field day how our team activity did not reflect the National FFA AT&MS CDE and should have more time provided for the activity.

### **How it works/methodology/program phases/steps**

The first year of the off-campus team activity building activity was the first-year return of the in-person CDE field day following the Covid-19 Pandemic. Faculty and teachers did not have an opportunity to meet in person to discuss the content or format of the upcoming state event in Spring 2021. A solar fountain activity was selected by the Agriculture Mechanics CDE Faculty Chair. A description of solar-powered fountains was developed. A search for articles about solar-powered fountains was conducted and results (Aronson & Allen, 2005; Allen, Aronson & Atchison, 2009) were included in a packet. Materials, vendors, and description of materials were included. Twenty-five high school teams participated bringing solar PV modules, DC-powered submersible (sump-style) pumps, cables to connect modules to pumps, and containers. Teams were encouraged to be creative in their design and operation. Teams arrived in the morning, unloaded and set up their fountain projects. Garden hoses were made available for teams to access water and fill their fountains. A team of judges made up of undergraduate students and agriculture faculty visited each team and viewed the operating fountains. Team members were asked about their fountains to determine level of knowledge of solar-powered (PV-direct) systems. Measuring power (in Watts), connecting modules in series and parallel

The following year, the state field day was expanded to a two-day event. Agriculture Mechanics CDE was Friday morning. With this change, time was not a factor in the length of the event. During a CDE planning session, teachers encouraged staying with the build-it-at-your-own-lab process. They suggested a welded garden bench project. Teams would select metals of their choosing and cutting and welding processes. Dimensions on length and height of the seat were provided as a metric to guide in the evaluation of project. Teams were encouraged to be creative in their design yet produce a functional bench. All projects were to be created, finished and brought to the university. To allow for more time for the event, the team activity was moved to the end of the event.

For the 2024 state event, we elected to have a construction activity where wood would be a predominant material. This would benefit teams from schools with limited or no welding equipment. Teams would construct poultry coops. An announcement of the team activity project was made to the teachers during the 2023 summer conference. A completed coop would be built to accommodate eight laying hens. The housing would provide biosecurity (protection from predators), food, watering, and shade. A packet containing a description of the project, suggested materials, minimum space requirement, a scoring rubric, and links to cooperative extension poultry housing ideas was distributed. An electronic version was emailed to the state FFA advisor for posting on the state FFA website of state Career Development Event (CDE) activities. Coops could be transported as one complete unit or transported in sections and erected on site before the event. Delivery could take place as early as five days before the event. For this event, scoring emphasis would be placed on project documentation, and group presentations. To aid teachers, a project construction packet was adopted (San Antonio Livestock Show and Rodeo Junior Agriculture Mechanics Show, 2023) and modified to fit our event. Not all teams competing in the CDE participated in the team activity. Teams competing in the state event must complete an online CDE testing exam two weeks prior to the state event. The top 25 teams with the highest student scores are eligible to compete in the state event. Although information about the CDE team activity was shared with teachers in July, a few teams revealed that they did not begin actual construction of their project until two weeks prior to the field day, based on the results of the team performance on the Online CDE testing.

#### **Results to date/implications**

For the first time, a CDE field day follow-up survey of agriculture instructors was conducted. Approximately 17 teachers of Agriculture Mechanics CDE teams responded to the survey. Findings revealed that 60% of the respondents were either Very Satisfied or Satisfied with the CDE and 26% were Neutral and 13% were Unsatisfied. Under general comments for Agriculture Mechanics, the “*team project concerns, about size, cost, equity, logistics*”. There were seven comments of this nature.

#### **Future plans/advice to others**

The next Team Activity for the Arizona FFA Agriculture Mechanics CDE will be announced during the state agriculture teacher educators conference in July. Reference materials will be emailed to the state FFA advisor to be posted to the state FFA website. Educators and adult individuals designated as a coach of the Ag Mechanics CDE team can access the materials.

Our plan is to attend the eight regional FFA CDE field days with our wind tunnel system and data collection sensors. Participating teams can bring their completed wind turbine projects (KidWind Challenge, 2024) and test performance in the wind tunnel. Teams can view turbine results, adjust the number of blades, set angle of blades, and view performance data. Teams can document performance and make changes prior to coming to the state event in February 2025.

#### **Costs/resources needed**

Material costs for the hosted- Team Activity varied each year with the type of activity selected. Resources such as time, preparation, available space, and access to power have been limiting factors. Availability and number of identical pieces of equipment from local vendors such as tractors, implements or engines factor into the design of the activity have been limiting factors. Teams now work within their means, level of creativity, and local resources to succeed.

## References

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