

AGRICULTURE MECHANICS PROJECTS SHOWS - S T E M

Looking at the goals of most shows today you will see statements like “emphasizes agriculture and education to develop the youth of Texas” in their goals.

I cannot STRESS this enough, the major goal of an ag mech project show today is not building a trailer or squeeze chute. The primary goal is the exhibitors learning derived from designing, building and exhibiting the project.

The exhibitor may never build another trailer but they will continue to use the skills and knowledge achieved in building the project throughout their careers.

The exhibitors Knowledge Presentation and Research account for almost half of the points assigned to a project in an agriculture mechanics show.

A majority of our rules and the things we do at the San Antonio (JAM) Show are to encourage and reinforce the educational benefits. Our judges emphasize the **why** over the **how** when questioning and evaluating the exhibitor.

I believe Ag Mech programs are more S T E M oriented than any other curriculum or program in the School.

“STEM is a teaching philosophy that integrates all four disciplines Science, Technology, Engineering and Math into a single, cross disciplinary program which offers instruction in the real world (as opposed to purely academic) applications and teaching methods.”

Educators throughout the country consider STEM as a new way of learning – to quote Watt Dalton with Accelerated Pathways – “This type of education, learning by doing, will be a large part of your day in a STEM program”.

As all of you know, FFA has had this motto *learning by doing* since its inception.

Heck we call Agriculture Teachers, Agricultural Science Teachers so we have the Science taken care of.

I will use two 2021 exhibitors as examples to illustrate how JAM integrates Science, Technology Engineering and Math in planning, designing, constructing and exhibiting an Agricultural Mechanics Project.

TAYLOR BARRETT

Taylor Barrett from the Madisonville FFA showed a Welding Skid in Class 204 - Other Shop Equipment

Show Picture if Power Point

Taylor Barrett Madisonville FFA



Exhibit 1416 - Welding Skid - Class 204 - Other Shop Equipment

Judges evaluated Taylor and her Project as they do all exhibitors, by asking her questions regarding her understanding of the project and her knowledge and participation in researching the project including designing and constructing it.

Her Welding Skid Carrier is a device built on rubber crawler tracks to carry a diesel-powered welding machine in this case a machine capable of GMAW, GTA and conventional SMAW processes. There is a cutting torch also on the skid carrier. The welding machine on the carrier is remote controlled in that welding adjustments – Amp, Wire Speed and Voltage can be controlled using radio signals from a hand-held controller. In addition, the skid can be remotely moved to a new location by the welder. It is on crawler tracks making it navigable over rugged terrain found at many construction sites. Taylor explained that a welder could remotely move the skid up to where they were welding for example on a pipe corral.

Taylor's teacher and her dad helped her in designing the skid. It has transducers and sensors along with radios to allow it to be remotely controlled. In questioning her the judges evaluated her involvement and understanding of the technology used. Her workmanship including the welding, plasma cutting from her CAD drawing were evaluated along with painting and finishing

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the project. She explained that she used the GMAW - gas metal arc welding process identifying inert cover gasses, welding wire AWS classification, voltage and wire speed and processes such as stick out and other perimeters.

She cut out parts using a plasma arc torch from CAD Drawings she drew. She connected and assembled electric motors and controls that drove the skid along on rubber tracks.

Judges questioned her about all of these along with examining her extensive research and documentation package which included: a) CAD drawings with dimensions drawn to scale, b) Bill of Materials –presented on an Excel spreadsheet listing all materials, their descriptions and sizes including itemized and total costs, c) Photographs of the planning, designing and construction phases, and d) Research documents including SDS - safety data sheets germane to the paints chemicals and supplies she used. PI product information and manufacturers specifications, applicable codes and statutes were also included in the research portfolio.

Not only did Taylor win her class she also won the *Karl Russell Memorial Award* we present for the most innovative project in the show.

CASE KOLINA

The other exhibitor I will identify is Case Kolina from the Rogers FFA. He exhibited a 1948 Allis Chalmers G tractor.

Show Picture if Power Point

Case Kolina Rogers FFA



Class 1401 - G Allis Chalmers Tactor - 1950 & Older Class

Exhibitors in the tractor divisions completely restore a tractor. In this example the tractor was an antique - a 1948 Allis Chalmers G and is somewhat rare.

Case only 10 or 11 old demonstrated his ability to disassemble, completely diagnose and repair each part of the tractor and reassemble it to new condition. Exhibitors in this division also perform all the mechanical activities including measuring and diagnosing all parts with precision tools such as small hole and telescoping gauges, torque wrenches, micrometers and digital calipers along with specialty tools and instruments to analyze the different systems, engine and drive train on the tractor. Electrical including charging and starting systems, hydraulics, pistons, rods, valves and crankshafts, fuel systems, clutches and transmissions are all completely disassembled, repaired or replaced. Judges validate all of these activities by questioning the exhibitor and inspecting the accompanying extensive documentation. The exhibitors also do the esthetics to restore the tractor to original condition in the Restoration Classes. Tractor judges completely inspect the workmanship including the painting and finish.

In some cases, exhibitors will put the restored tractor on a PTO dynamometer to test its horsepower after restoring it. Tractor should produce what it did at the Nebraska horsepower test when it was new.

I chose Case to illustrate the tractor division because he was so young and knowledgeable. He won his class but most impressive was his knowledge, showmanship and presentation. He also won a showmanship award. He is full of energy and enthusiasm. When visiting with him there is no question that he already is an outstanding mechanic and can be a mechanical engineer if he desires to go that way in not only repairing tractors but in designing and manufacturing them.

I wish you could meet him.

This show is a gateway for many high school students to prepare for college.

Both Case and Taylor along with their projects are depicted in the Awards Presentations on jamshow.org. A link is also provided to Ed Speeds web site with pictures of them and their projects along with almost 1000 other pictures of the 2021 show.

Please get on the jamshow.org WEB page and view all our award winners in the Awards Presentation and click on the link to Mr. Speed's pictures.

It is evident that JAM exhibitors are participating in a STEM program. Every exhibitor not just those I highlighted must do the same in documentation and knowledge to be competitive. They are learning by doing utilizing all four STEM disciplines.

Dr. Lon R. Shell – Superintendent
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San Antonio Stock Show and Rodeo