NATIONAL ENGINEERING DESIGN COMPETITION (NEDC)
MESA ARDUINO STEM SOLUTIONS (2017-2018)

MESA UTAH ADDENDUM #1

https://mesaut.org/resources/nationalcompetition/

STATE COMPETITION

The MESA Utah Engineering Design Competition will be held during the USU Physics Day at Lagoon in May.

LOCAL COMPETITIONS

Each team should participate in at least one practice competition prior to the state competition. Schools and districts are encouraged to conduct practice competitions prior to the state competition. Granite School District will be holding a practice competition during their annual MESA Day Competition on March 14, 2018. If space permits, teams from other schools might be able to compete in Granite's practice competition.

Optionally, teams may enter their projects in their local STEM Fairs. https://stem.utah.gov/for-students/fairs/

UTAH COMPETITION THEME

To facilitate consistency and reliability in judging, MESA Utah will select a single theme for the competition. When students complete their 2017-18 Student Information Forms (SIF) before October 1st, they will also vote on which theme they prefer for the State Competition. The topics available for voting include:

a) Improving air quality.
b) Improving energy production.
c) Improving health or physical fitness.
d) Improving transportation.
e) Improving water supply or water quality.

The theme for the Utah Competition will be announced in Mid-October. Look for the MESA Utah Addendum #2.

GETTING STARTED

To get started, students should first familiarize themselves with the engineering design process and with the basics of programming an Arduino. Students may benefit from practice using the engineering design process and an engineering design notebook with a simpler project before starting work on their project for the national competition.

ENGINEERING DESIGN PROCESS

Students will need to use the Engineering Design Process and will need to document their steps in a notebook. The design process includes these steps:

1. Ask a question about the goal.
2. Imagine a possible solution.
3. Plan out a design and draw your ideas.
4. Create and construct a working model.
5. Experiment and test that model.
6. Use test results to Improve and revise that model.

Repeat

The following sites may help students understand the Engineering Design Process:

- https://www.eie.org/overview/engineering-design-process
- https://www.nasa.gov/pdf/630754main_NASAsBESTActivityGuide6-8.pdf
- https://youtu.be/fxJWin195kU

ENGINEERING DESIGN NOTEBOOK

Students **must** use an engineering design notebook and document their progress through each of the six steps of the engineering design process (above). The following design book templates may help students document their progress.

- http://bit.ly/suutemplate (Recommended)
- http://bit.ly/plumesatemplate (Recommended)
- http://bit.ly/azmesatemplate
- http://bit.ly/gadoetemplate
- http://bit.ly/odetemplate

ARDUINO FOR BEGINNERS

- Acquire an Arduino with some accessories such as a USB cord, LEDs, a motor, and a speaker.
- Practice programming the Arduino by making lights blink, spinning a motor, and making sounds with a speaker.
- Try one or more step-by-step Arduino projects. These can be found in books and by searching Google.

ARDUINO RESOURCES

- Arizona MESA Arduino Resources: http://azmesa.arizona.edu/resources-arduino
- Maryland MESA Arduino Resources: http://bit.ly/mdmesaarduino

PROJECT APPROVAL

Projects that include human subjects, vertebrate animal subjects, or hazardous substances, will need to (A) follow school and district rules and (B) gain SRC/IRB approval: https://slvsef.org/faq#src