2019 MICHIGAN SKILLSUSA CHAMPIONSHIPS
TASK & MATERIALS LIST

SKILL OR LEADERSHIP AREA: Additive Manufacturing

CONTEST LOCATION:

Amway Grand Plaza Hotel
187 Monroe Avenue NW
Grand Rapids, MI 49503, US
(616) 774.2000
http://www.amwaygrand.com/

RESUME:

Each student must submit a one-page printed resume before the contest start at the contest site (present to contest coordinator, not judges). The resume is no longer submitted online. This is the only time that resumes can be turned in. Failure to do so will result in a 10 point penalty.

Contest: 8:30 am in Governors Room

**Contest will start at 830 followed by lunch at Noon.*

Purpose: To evaluate each contestant's preparation for employment and to recognize outstanding students for excellence and professionalism in the field of Additive Manufacturing.

Clothing: White collared shirt, black pants, black socks, and dress shoes. School logos on clothing must be covered with tape.

Contestants: 2 teams from each school that has pre-registered to be part of the event.

Requirements: Each team is responsible for bringing their 3D Printed model to the competition. Models must adhere to the contest outlines from the proposed National Standards. Models will NOT be printed in advance for students. Teams without models, or with models that were not created with the recommended Additive Manufacturing methods, will be deducted points from the presentation portion of the competition.

Equipment:

Note: All contestants must bring their own computer hardware and ensure that their computer has the capability to run their software. The software should be activated and tested before the

contest. It should be tested to make certain it works with the WI-FI turned off and while not connected to the school's network. No internet access will be available. Teams without the ability to utilize their software will receive deducted points from the final score.

Appropriate licensure is required for all software. Refer to National Standards below for more information on Equipment. All schools should bring a 25' UL Approved Extension Cord and Surge Protector.

PLEASE NOTE: Students will **NOT** be given a design modification at the competition this year. The computer and software are only there in the event a judge has questions pertaining to the functionality of the 3D printed model provided and students need to verify their design matches the model.

Contest Criteria

On contest day, students will:

- Provide Engineering Notebook (Engineering notebook guidelines below)
- Present Design to judges and answer questions.
- Test 3D printed design on provided test rig for judging.

Engineering Notebook Guideline:

- Be clearly labeled with contestant number, date and page # on each page
- Begin with a problem statement
- Include discovery and documentation of approach to solve problem
- Include sketched design concepts with critical features labeled
- Critical dimensions clearly labeled in design sketch
- Considerations for designing for FDM distinctly addressed (i.e. part strength, part orientation) especially including any expected risks during printing
- Design decisions and alternatives are documented and evaluated thoughtfully

3D Printed Design Specification - Students must create a design that:

- With a build volume of no greater than 2X2X2in.
- Using no more than 5 in^3 of build material
- Using no more than 2 in^3 amount* of support material
- Print Model material usage must be verified within Engineering Notebook documentation, via a print screen

Presentation Criteria

- The team clearly describes their understanding of the problem to be solved.
- Design Process: good design logic is used for key design choices was intentional and well-communicated
- The presentation is professional and well-rehearsed

- Practical evaluation: Part functions way team intended in 3 out of 3 tests.

Knowledge Test:
A Knowledge Exam will also be administered during the competition to test students understanding of additive manufacturing and general CADD knowledge.

Equipment:

Note: Some teams may opt to bring a computer to showcase their designs or provide a presentation. A computer is not required unless you intend to utilize it for your presentation.

2019 SkillsUSA Additive Manufacturing State Contest

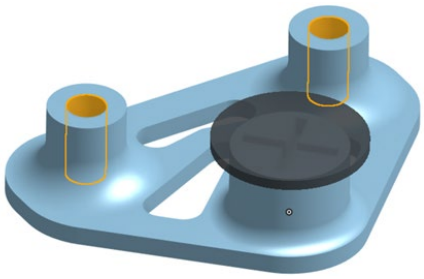
The goal of the 2019 SkillsUSA Additive Manufacturing State Competitions is to challenge competitors at that state level and send the best prepared students to compete at the National Competition in June. Each year's suggested state competition focuses on an additive manufacturing design with strict requirements on form, fit, and function of compact and intricate designs similar to nationals.

The below contest has been designed with the upcoming National Competition in mind and is designed to challenge students understanding of and skills in Additive Manufacturing.

This year's contest challenges students to design a 3D-printed device to flip an un-modified U.S. quarter) from heads to tales. They will need to design a device that fits into the testing rig (pictured below) and performs a specific task. They will also need to use their 3D printing knowledge to design a part that prints within the specified build volume, materials and times specified.

Quarter Query - Heads to Tails

Welcome to the "Quarter Query" challenge! The task at hand is to design and use a device made of only 3D printed parts to flip an un-modified U.S. quarter (provided at the competition location) from heads to tales.



“What’s the catch?” you say. Well, there are four, and here they are:

1. The device may only be operated by a single, unbent finger. Note: the device may not attach to the finger in any way.

2. The device must remain in contact with at least one Connection Point (orange in the diagram) at all times.

3. The quarter will begin heads-up on the Coin Pedestal (X mark) and either A.) Must finish tails-up back on the pedestal (most challenging, most points awarded), or B.) Must finish tails-up anywhere on the flat surface provided (less challenging, less points awarded).

4. The device must follow these 3D printing specs measured in GrabCAD Print:
    - Prints in less than 2 hours
    - Has a build volume of no greater than 2x2x2 in
    - Uses no more than 5 in^3 of model material
    - Uses no more than 2 in^3 of support material
    - **Appropriate data must be provided to show stipulations are met.

Sound impossible?

Here’s some help: you may use one rubber band in your design. The rubber band you choose to utilize must be brought with your model to the competition. We will not be providing the rubber bands. This allows for students to determine what size, length, etc., rubber band that works best with their design.

The competition rig will be fixed to a large flat surface, and its file can be found here https://grabcad.com/library/2019-testing-rig-1

For questions pertaining to the competition, please contact Joey Close (Joeyclose@atctrain.com)

Revised 3/4/19