Additive Manufacturing

Contest Date(s):

Design Submission Deadline ONLY – March 17, 2021

Engineering Notebook Submission Deadline ONLY – 11pm on March 26, 2021

Contest Date – March 31, 2021

(Time slots TBD; See details below)

Contest Type: VIRTUAL

(All contest types are listed on the website. YOU NEED TO BE FAMILIAR WITH BOTH THIS DOCUMENT AND THAT DOCUMENT.)

Submission Link(s):

For Designs (by March 17th):

www.tri-c.edu/ideationstation

(See additional instructions included below)

For Engineering Notebooks (by 11pm on March 26th):

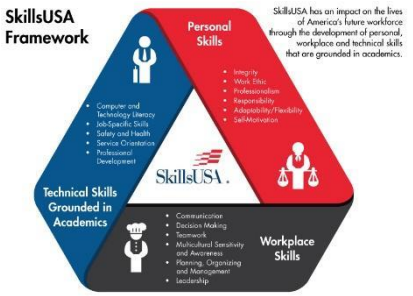
https://www.dropbox.com/request/G8bw3iqzmq5EMEUUtWHc

Contest Link(s):

(Will be provided by Cuyahoga Community College; see details below)

Additive Manufacturing

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



ELIGIBILITY
Team Event; competition in accordance with the SkillsUSA Ohio Program Guidelines for eligibility.

OUTLINE/ORIENTATION/DATES
Contestants will create their designs based on the contest criteria below. Students may print as many iterations as they want on their own printers, but once their design is completed, the final design will be submitted to the designated portal for printing by **Cuyahoga Community College's FabLab the "Ideation Station"**. One copy of the final print will be sent back to the competing schools, and another will be sent to the judge assigned to your team. Each team will be assigned a competition time after submitting their designs on March 17th.

- **Final Design must be submitted by March 17th.**
  - Utilize the following link to submit files and required information:
    - **www.tri-c.edu/ideationstation**
    - Go to "Upload 3D Printing Skills USA" Button
    - You must include your STL File, along with the following information:
      - Team Number
      - Email address to receive meeting time and webinar invitation.
      - Shipping address for final part to be received.
- **Engineering Notebooks must be submitted by 11pm on March 26th** via the Dropbox link provided
  - Notebook details found below
- **Competition: March 31st, Time TBD** (Based on total number of teams)
  - All participating groups will be assigned a judge and a timeslot on March 31st.
  - Each team will receive a meeting invitation to join a webinar at their assigned time. The platform will be shared out by Cuyahoga Community College.
  - Each team will have 20min to present their project to the judge and may "Share" any presentation material they have.

CLOTHING REQUIREMENTS
Jeans (with no holes) or Khakis accepted. No shorts or open toed shoes or sandals. Students can wear tennis shoes or work boots, but laces must be tied. Short sleeve polo, button up shirts and plain non-graphic T-shirts also acceptable. School logos on clothing must be covered with tape.

TOOLS PROVIDED BY CONTESTANTS
- Digital copy of a 1-page typed personal résumé
- Digitized Engineering Notebook (notebook guidelines found below)
  - Notebooks need to be digitized and uploaded to the Dropbox link provided by 11pm on March 26th
  - When possible, it is requested that notebooks be uploaded as a singular file containing all pages of the notebook in the appropriate order
    - Be sure to label the file in accordance with the Virtual Contest Format Guidelines document on the SkillsUSA Ohio website

SPECIAL INFORMATION

Contest Criteria

On contest day, students will:

- Show “virtually” their Engineering Notebook (Engineering notebook guidelines below)
- Present Design to judges and answer questions.
- Test 3D printed design on test rig
    a. It is recommended that teams print their own test rig (detailed in lower section) showcase their designs to judges.
    b. Judges will also have a test rig to verify functionality during the presentation time.

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:

- Prints in less than 3 hours.
- With a build volume of no greater than 3X3X3in.
- Using no more than 5 in^3 of build material
- Using no more than 2 in^3 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

2021 SkillsUSA Additive Manufacturing State Contest

The goal of the 2021 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.

Additive Manufacturing

This year's contest challenges students to design a hinged, covered enclosure (sample pictured below is only meant to show a sample of the hinged cover) for a wall-mounted standard USB port. Teams will need to design a device that fits into the testing rig 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.

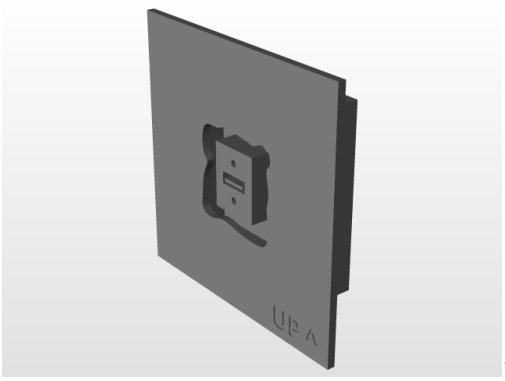
Power Up! USB Outlet Redesign

Welcome to the "Power Up!" challenge! The task at hand is to design and use a device made of only 3D printed parts that is hinged, covered and fixes to a provided wall mount.

"What's the catch?" you say. Well, there are five, and here they are:

1.) The enclosure must affix securely to the provided USB port base (see illustrated CAD below) using the screw holes, while still allowing access to the USB port.

2.) The enclosure must completely close the "hole in the wall" (see illustrated CAD below by red circle)



**Competition rig pictured*

3.) The enclosure must have a mechanically hinged lid (printed in place) that does not use external parts or hardware. This enclosure lid must open at least 180 degrees and stay open at 90 degrees when placed in that position.

4.) Device should have some uniqueness in design – such as shape, 3D printed texture, text… the options are endless – you are the product designer – flex your creative muscle.

5.) The device must follow these 3D printing specs measured in GrabCAD Print:
- Prints in less than 3 hours
- With a build volume of no greater than 3X3X3in.
- Using no more than 5 in^3 of build material
- Using no more than 2 in^3 of support material
- All specifications must be verified with print screens in Engineering Notebook.

The competition rig will be fixed to a large flat surface, and its file can be found here https://grabcad.com/library/skillsusa-2020-state-challenge-1