

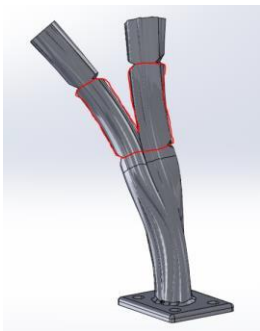
Additive Manufacturing Contest

The goal of the SkillsUSA Additive Manufacturing State Competitions is to prepare students for a National Competition that will focus on an additive manufacturing design with strict requirements on form, fit, and function.

The below contests have been designed with the National Competition in mind. These competitions will prepare students for competing at Nationals and challenge their understanding of Additive Manufacturing.

The contests are designed to be customized to your unique contest guidelines, timelines, and resource constraints. Look for “*example*” for items that are easily changed in the contest.

All contests focus around a tree branch file that can be accessed on GrabCad Workbench here: <https://grabcad.com/library/skillsusa-2017-additive-manufacturing-state-competition-file-1>. The tree branch file has been prepared with a designated connection point. The designated connection point is an area where the students’ designs must touch the tree brand. The designated connection point is outlined in red in the below image. :



The tree branch is also designed with holes to fix the branch to a structure so that the branch runs parallel to the floor. How you chose to build the branch (materials, fill, size, etc) is up to you. Just make sure to edit the contest accordingly.

Contest One:

Tire Swing Challenge:

Students must design a fixture that connects a tire swing to a tree branch in a designated location. The tire swing fixture must stay connected to the tree branch when force is applied. Force is defined as a person moving the tire swing fixture with a light amount of pressure. The tire swing fixture must include a moving assembly and hold a chain that is ***6"-8" long and hold 8 oz attached weight***.

Students must create a design that prints in no more than ***4 hours*** with a build volume of ***2" x 2" x 2"***. Students may use no more than ***3 cubic inches*** of build material and ***2 cubic inches*** of support material. Students must submit CAD, STL and CMB files to be printed via email to 'info@mw3ds.com' no later than 11:00AM ***CST*** on ***April 19th..** Final prints will be delivered day of contest.

On contest day, students must submit:

1. Engineering Notebook (Engineering notebook guidelines can be found here)
2. 3D printed design - provided by contest chair day of contest
3. Presentation of design

Contest Two:

On-Site DESIGN CHALLENGE – Utilizing Same Tree Branch:

Students will be given an on-site 'Design Challenge' that connects to the same tree branch in a designated location. Students should bring their own computer with working CAD software, along with the GrabCAD Print software to process the design with the following parameters.

Students must create a design that prints in no more than ***3 hours*** with a build volume of ***2" x 2" x 2"***. Students may use no more than ***3 cubic inches*** of build material and ***2 cubic inches*** of support material. Students must submit CAD, STL and CMB files to be judged.

On contest day, students must submit:

4. Engineering Notebook (Engineering notebook guidelines can be found here)
5. 3D CAD file design (SolidWorks, Inventor, or STL file)
6. Presentation of design (via notebook and explanation)



IOWA ASSOCIATION
OF SkillsUSA

For each contest:

- Tree Branch file can be found on GrabCad Workbench.

Student deliverables for each contest:

1. Engineering notebook
2. STL and/or CMB design files submitted
3. Presentation of design

Judging the Contest:

Students should be judged on:

- 1) Engineering notebooks
 - a) Did the students follow any guidelines provided? States are encouraged to provide their own Engineering Notebook Guidelines.
 - b) Did students show their design process?
- 2) Following all requirements outlined in contest
 - a) Build time
 - b) Build volume