SkillsUSA 2023 Additive Manufacturing District 4 Challenge Change it up!

Welcome to the Change it Up challenge! The task at hand is to design and use a device made of only 3D printed parts to lock up $4.00 in US quarters (provided at the competition location).



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

1. The device must lock the container and the locking mechanisms must be printed in place.
2. The device must remain locked when tumbled or rolled around.
3. No change should fall out or be able to be removed when locked.
4. The device must follow these 3D printing specs measured in GrabCAD Print:
   * Prints in less than 5 hours
   * Has a build volume of no greater than 4x4x4 in
   * Uses no more than 6 in³ of model material
   * Uses no more than 3 in³ of support material

Sound impossible?

Try to stump the judges and create a container that they cannot solve to open! Remember this is additive manufacturing and your design should reflect a design that cannot be made with traditional manufacturing processes. The 3D prints will be printed with water sollulable support for the competition.

Logo

Description automatically generated

**Contest Criteria**

On contest day, students must submit:

1. Engineering Notebook (Engineering notebook guidelines below)
2. 3D printed design files
3. Printed part
4. Presentation of design
5. Engineering Notebook should:

 Be clearly labeled with contestant name(s), 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

1. 3D Printed Design - Students must create a design that:

 Prints in less than \*5 hours\*

 With a build volume of no greater than \*4x4x4in\*.

 Using no more than 6 in³ of build material

 Using no more than 3 in³ amount\* of support material

1. 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.