Pennsylvania College of Technology
A Penn State Affiliate

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Manufacturing Externship – Application in the Home School Acknowledgement*

1. Educator Name: John Bishel
2. School District and School: Seneca Highlands CTC (serve 10 school districts)
3. Date(s) of Manufacturing Unit: May, 2021
4. Length of lesson or unit: 2-1/2 hours (was goal, but took longer for some)
5. Number of students: 15
6. Grade level of students: 10^{th} – 12^{th} grade

Description of Activity:

Students designed cylindrical "paper airplanes" on Fusion 360 to be printed on our 3D printer. We had previously made them out of paper earlier in the year. Once students had their 3D prints, they tested how well they flew. Students then had the chance to modify their designs in Fusion 360, reprint them on the 3D printer, test fly their prints, and report results.

What elements from your Manufacturing Externship were used in the preparation or delivery of the unit? (i.e. robot, PPTs provided, information gathered from discussions or tours, etc.)

CAD/CAM and rapid prototyping. Additive manufacturing/3D printing.

How were students engaged with the unit? What hands-on activities occurred?

They got hands-on experience with Fusion 360, Fablicator 3D printer, and, of course, test flying the print of their designs.

Explain connections that were created/discussed between manufacturing careers and higher education.

We talked about how learning CAD/CAM and additive manufacturing in high school and college will give them valuable tools for industrial careers. The ability to be part of a rapid prototyping team is valuable to industry.

How did students respond to the unit?

They learned the basics of Fusion 360 and 3D printing while enjoying a bit of friendly competition.

Were parents involved or aware of the unit? No. What was their response to the activities? N/A

The Manufacturing Externship program at Penn College was supported by the National Science Foundation under Grant No. 1902379.

A goal of this program is to make advanced manufacturing education and information available to high school students. As such, Penn College is attempting to build a repository of activities that can be used across the K-12 environment. In the subsequent pages, please provide additional information on the lesson/units you implemented so that others can implement similar activities in their classrooms. Please be sure to include any material lists, photos/evidence of student work (not of student participants), and any other relevant information required to implement in another school.

*By submitting this form, you acknowledge all information is accurate and correct to the best of your knowledge and you agree to the sharing of this information via publicly accessible websites.

https://www.jpl.nasa.gov/edu/teach/activity/ring-wing-glider/

https://www.instructables.com/Tubular-paper-airplane/