

# MELEAH STEELMAN

3D PRINTING/ADDITIVE MANUFACTURING

WELLBORN MIDDLE SCHOOL

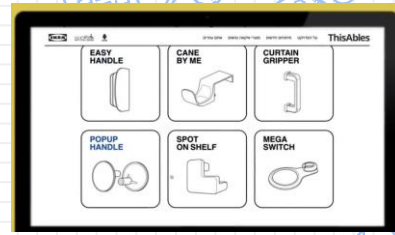
15510 ROYDER RD, COLLEGE STATION, TX 77845



# 3D Printing/Additive Manufacturing Unit



1. This unit will be taught twice during the school year--fall and spring.
2. Year 1 Costs = \$199.70. Year 2 Costs = determined by year 1 data.
3. Number of students affected--approximately 140, 70 each semester.



## UNIT OVERVIEW

**1-OBJECTIVE:** The student will create a 3D printed prototype of an object that solves a problem they identify. (Life Skills class/teacher or someone in their life)

**2-GRADE LEVEL:** 7th and 8th Grade

**3-TEKS: §130.355. Manufacturing Engineering Technology I**

(2) The student applies software skills to manufacturing. The student is expected to:

(A) use computer-aided design (CAD) software to complete a design;

(B) analyze the results of product testing in a simulated modeling environment; and

(C) fabricate a prototype design of a mechanical part.

**4-The project will be included in the 3D printing unit.**

**5-Students should have completed lessons using Fusion 360 and measuring with calipers.**

**6-The unit will take two to three weeks.**

**7-Fusion 360, laptops, 3D Printer, calipers and PLA.**

**8-Students 3D printed prototype will successfully solve their identified problem and will be graded with a basic rubric.**

## Day 1

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**Objective:** Students will brainstorm and create a sketch ideas for their prototype using their engineering notebook. (daily grade)

**Activities:**

1. Watch [https://youtu.be/a0PA\\_VpLIDw](https://youtu.be/a0PA_VpLIDw)
2. Present a problem for students to solve as a class: Choose between the following problems to solve.
  - a. Person A wants to live independently, however, they struggle with brushing their hair because their muscles movements are inconsistent. What can you design to help them accomplish this task independently?
  - b. Person B wants to live independently, however, they struggle with putting their socks on. What can you design to help them accomplish this task independently?
3. Work through the engineer design process, whole group, to solve the problem. Students share their ideas.
4. Prior to this activity, the teacher, with approval from the Life Skills teacher, will video students in the Life Skills class. Students will watch this video to identify problems the Life Skills students are having. Once they have identified a problem, they will write a proposal and draw a sketch in their engineering notebooks about how to solve the problem and submit it for approval.





## Day 4 & 5

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**Objective:** Students will complete and download their .stl files for approval and printing. After teacher approval, students will set up their print on the 3D printer Makerbot software for printing. (.stl file = daily grade)

### Activities:

1. Make final touches on prototype in Fusion 360.
2. Download the prototype file as a .stl file.
3. Turn in file on Schoology for teacher approval.
4. Once approved, set up your print on Makerbot Replicator software for printing.



## Day 6 & 7

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**Objective:** Students will test their prototype and make necessary adjustments. Students will document this process in their engineering notebook. (engineering notebook = daily grade)

### Activities:

1. Test prototype
2. Hypothosize improvements and document in your engineering notebook.
3. Take more measurements if necessary- document.
4. Make changes to the prototype in Fusion 360.



## Day 8 & 9

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**Objective:** Students will create a sales flyer using [Canva](#). (daily grade)

### Activities:

1. Create a sales flyer in Canva. Include the following:
  - a. Photo of prototype
  - b. Image of CAD drawing with measurements displayed
  - c. Prototype description including problem solved
  - d. Minimum of 3 different Canva elements
  - e. Cost to manufacture
  - f. Cost for consumer (how will it be priced)
2. Download Canva file as a .pdf
3. Turn in .pdf file on Schoology



## Day 10

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**Objective:** Students will present their prototype and sales flyer to the class (MAJOR GRADE).

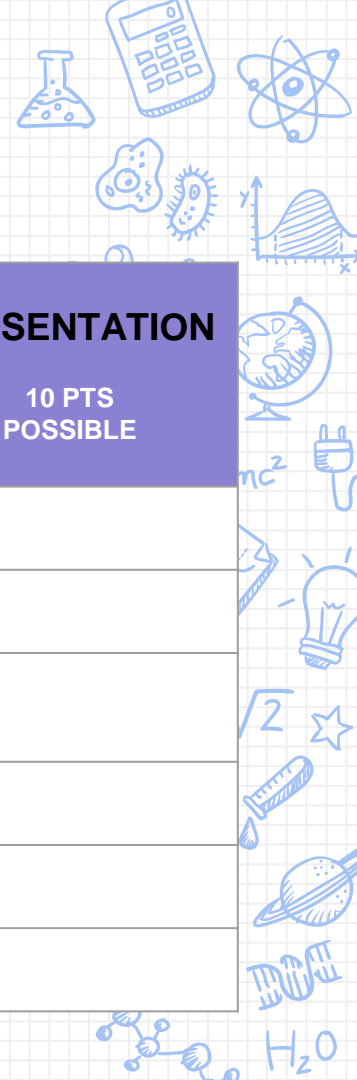
**Activity:**

1. Prototype & Sales Presentations





# 3D PRINT UNIT GRADING RUBRIC



<b>LEVELS</b>	<b>PERCENTAGE OF POINTS POSSIBLE FOR EACH CATEGORY</b>	<b>PROTOTYPE</b>  60 PTS POSSIBLE	<b>FUSION 360 DRAWING</b>  15 PTS POSSIBLE	<b>SALES FLYER</b>  15 PTS POSSIBLE	<b>PRESENTATION</b>  10 PTS POSSIBLE
<b>UNACCEPTABLE</b>	50%				
<b>EMERGING</b>	65%				
<b>MINIMALLY ACCEPTABLE</b>	75%				
<b>ACCEPTABLE</b>	85%				
<b>ACCOMPLISHED</b>	90%				
<b>EXEMPLARY</b>	95-100%				