

**NFT-RET:  
ENHANCING  
TEACHER  
KNOWLEDGE &  
SKILLS IN MODERN  
MANUFACTURING**

**FUSED DEPOSITION  
MODELING VS  
SILICONE MOLDING**

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**OBJECTIVE:** THE OBJECTIVE IS TO HAVE STUDENTS COMPARE THE ADDITIVE MANUFACTURING PROCESSES, FDM AND PLASTIC MOLDING, AND CONCLUDE WHICH IS BEST.



**GRADE:** 9<sup>TH</sup> – 12<sup>TH</sup>  
PRINCIPLES OF APPLIED ENGINEERING  
@BUELL CENTRAL DAEP



**TEK:** 6B. IDENTIFY THE CHEMICAL, MECHANICAL, AND PHYSICAL PROPERTIES OF ENGINEERING MATERIALS



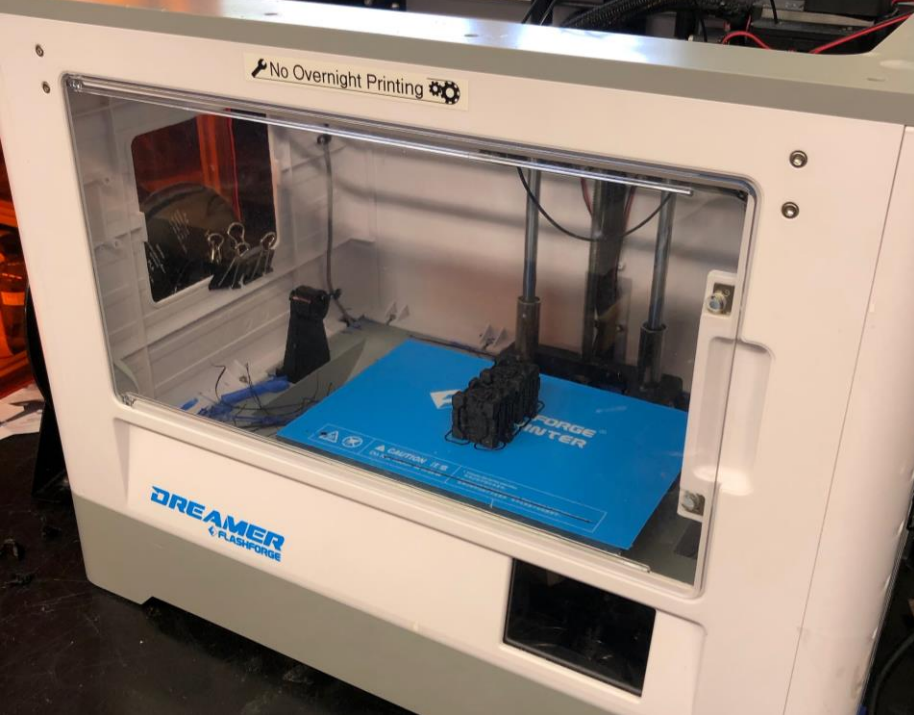
**PRIOR KNOWLEDGE:** THE NEW LESSON WILL INTRODUCE THE CONSTRUCT PROTOTYPE STEP OF THE DESIGN PROCESS AND ADDITIVE MANUFACTURING PROCESS. THE STUDENTS WILL KNOW HOW TO USE FUSION360, THE DESIGN PROCESS, MEASUREMENTS AND MATERIALS.



**TIME:** 3 WEEKS



**MEASURE SUCCESS:** MEASURING SKILLS, FINAL PRODUCT, UNDERSTANDING THE PROCESS (TEST/PRESENTATION), ROBOTICS COMPETITIONS, SHARPENING DESIGN PROCESS AND MANUFACTURING SKILLS.



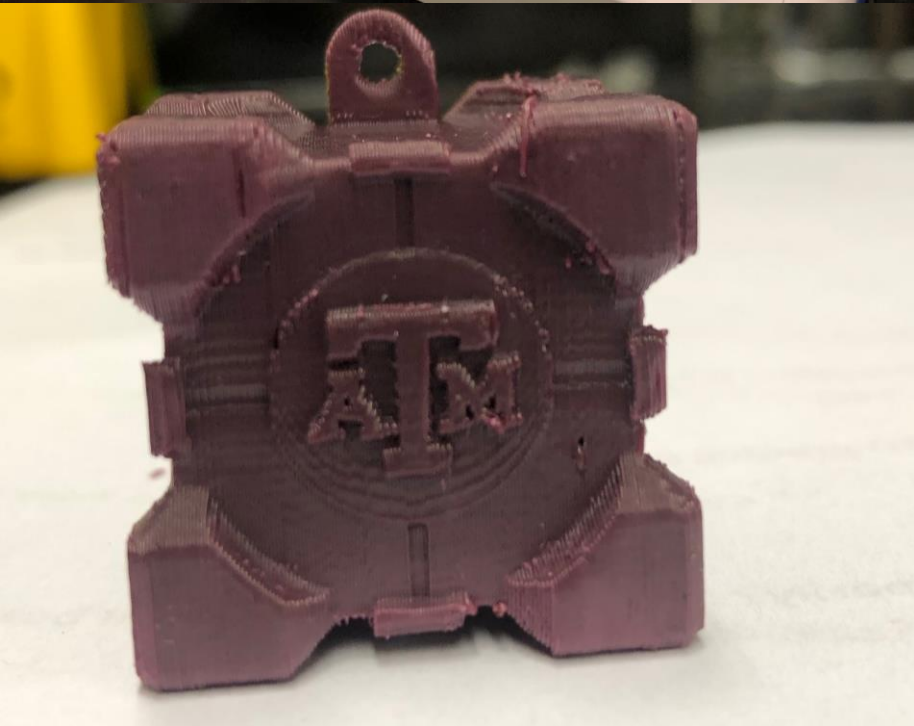
# FDM (FUSED DEPOSITION MODELING)

- ADDITIVE PROCESS THAT DEPOSITS MELTED MATERIAL IN LAYERS OVER A PRE-DETERMINED PATH
- TYPES OF MATERIAL

ABS (Acrylonitrile Butadiene Styrene)

PLA (Polylactic Acid)

- FUSION360
- MAKERBOT
- SANDPAPER (HIGH GRIT) TO GET A SMOOTHER FINISH



# SILICONE MOLDING

- **MOLDING:** SILICONE MOLD IS CREATED OUT OF DESIRED OBJECT (**Smooth On Sorta-Clear 40**)
- **CASTING:** POUR EPOXY (**MAX 1618 Clear Epoxy Resin**) INTO MOLD WAIT UNTIL THE PLASTIC CURES AND PULL CASTED PART OUT OF THE MOLD
- STUDENTS MEASURE DIMENSIONS OF CAST USING A DIAL CALIPER



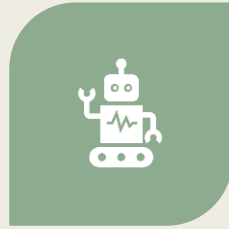
# RESULTS



MEASURING  
SKILLS



3D PRINT AND  
RESIN CASTING



ROBOTICS



ARTS AND  
CRAFTS



FUTURE  
PROJECTS AND  
COMPETITIONS

# COST OF MATERIALS PER YEAR

- ABOUT 60 STUDENTS PER YEAR : 8 CLASSES

Item	Price	Source	Quantity	Total
Large Spool Filament	\$ 65.00	MAKERBOT	2	\$ 130.00
Dial Caliper	\$ 18.00	HARBOR FREIGHT	6	\$ 108.00
SmoothOn Sorta Clear 40	\$ 55.00	AMAZON	4	\$ 220.00
MAX1618 Epoxy Clear Resin	\$ 96.00	AMAZON	2	\$ 192.00
PLA Filament	\$ 35.00	MAKERBOT	4	\$ 140.00
Air Pump	\$ 25.00	WALMART	1	\$ 25.00
Pressure Cooker	\$ 30.00	WALMART	1	\$ 30.00
			<b>TOTAL:</b>	<b>\$ 845.00</b>



QUESTIONS?