Incorporating 3D Printing in Middle School Inquiry-Based Design Projects

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General Description
In the eighth grade, students receive instruction in Technology & Engineering. Learning the Engineering Design Process is a vital part of this instruction. These projects provide a novel approach to engage students in inquiry-based, problem-solving activities using the Engineering Design Process and 3D printing.

Objectives
- To increase students’ knowledge of the Engineering Design Process
- To increase students’ knowledge of 3D modeling and 3D printing
- To increase students’ problem solving skills using inquiry-based learning

Standards Addressed
6.MS-ETS1-1: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution. Include potential impacts on people and the natural environment that may limit possible solutions.

6.MS-ETS1-6(MA): Communicate a design solution to an intended user, including design features and limitations of the solution.

7.MS-ETS1-2: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. Use a model of each solution to evaluate how variations in one or more design features, including size, shape, weight, or cost, may affect the function or effectiveness of the solution.

7.MS-ETS1-7(MA): Construct a prototype of a solution to a given design problem.

Our Assistive Device
By: Lori Manoukian, Madison Covino, and Christina Manxhari

Goal: To design a device to carry books and small objects for a person on crutches
Constraints: Must be safe; Must weigh less than 2 lbs.; Must carry a minimum of 4 lbs.; Must attach to a pair of crutches [or an individual crutch] in some way; Must develop two possible designs, then actually create one

6.MS-ETS1-6(MA)