

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

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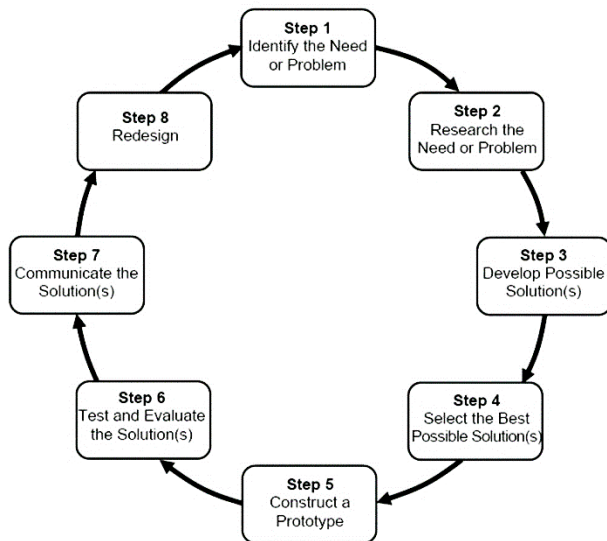
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General Description

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.

Steps of the Engineering Design Process



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

Plexiglas border to prevent sagging

Velcro straps on both sides of the bag to shut

Strap that ties to crutch under the underarm padding

Suspenders that attach to bag and body

Canvas Bag itself

6.MS-ETS1-6(MA)