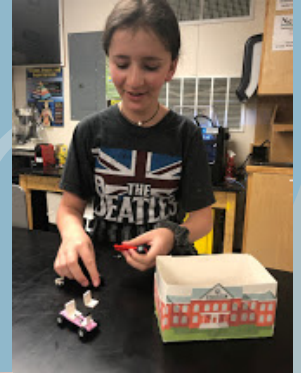


Middle School Therapeutic Toys

Project Overview:

In this project, students discover the design process and develop an understanding of the influence of creativity and innovation in their lives. They are then challenged and empowered to use and apply what they've learned throughout the unit to design a therapeutic toy for a child who has cerebral palsy. The students will then research and identify a company to pitch their toy to. Teams will patent the toy idea through the United States Patent and Trademark Office. Finally, the teams will identify why their product is unique and develop a pitch. They will create a "Shark Tank style" presentation for both the company they identify and to a panel of educators and business professionals. Finally, the toys will be given to both a preschool and a local occupational therapy clinic.

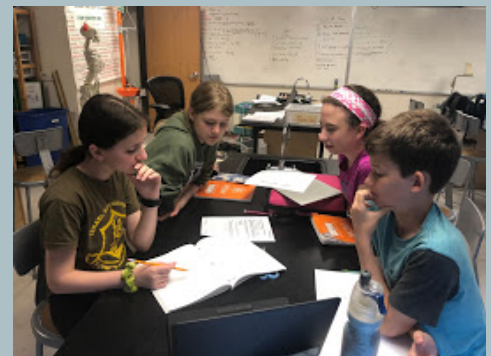


Essential Questions:

- How can I design, fabricate and market a therapeutic toy for children with cerebral palsy?
- Why is it important to engage stakeholders during the design process?
- Why are teams of people more successful than an individual when solving problems?
- Why is brainstorming, research, and testing important when creating, modifying, or improving a design solution?

Student product:

Students design, build and test a therapeutic toy to be used in a therapeutic setting for children with cerebral palsy.



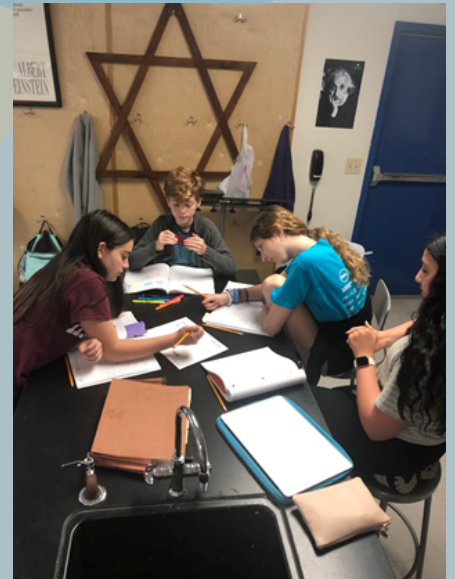
Project Calendar:

September – October: Introduction to Design

Students discover the design process as they complete an instant design challenge to create an ankle foot orthosis. They learn thumbnail, orthographic, isometric, and perspective sketching as methods for communicating design ideas effectively without the use of technology. The use of a common measurement system is essential for communicating and fabricating designs. Students learn conversions between two measurement systems and apply measurement skills while dimensioning sketches. Students conduct a mechanical dissection in the lesson project to better understand how objects and parts interact while using sketches to communicate and document their findings.

November through January: Modeling and Statistical Analysis

In this lesson, students transfer a two-dimensional representation to a three-dimensional solid model with technology. Students study basic geometric shapes within a mathematical model and use combinations of geometric primitives to form more complex shapes. During the design project, students work in teams and apply the design process to create a puzzle cube. Students create a solid model using a computer-aided design (CAD) application and fabricate their design solution for testing. Students use a dynamic mathematics program to complete statistical analysis from their testing results to determine if their design met the criteria and constraints.



February through April: Design Challenge

Students use a simulation to better understand cerebral palsy prior to beginning their Therapeutic Toy Design Challenge. Within teams, students brainstorm and select a design solution to the problem based on design requirements. They establish team norms, collaborate, and recognize that solving authentic problems involves interdisciplinary skills such as engineering, biomedical science, and computer science skills. Using the design process, students create a solid model of their design, build a prototype for design testing, and make necessary design modifications based on testing results.

The toy will be marketed and pitched to a panel of business professionals and educators in a shark tank format. Middle school students will give toys to preschools and occupational therapy clinics.