



# Southmoreland School District Structural Engineering Curriculum Overview

## **Structural Engineering Overview**

Structural engineering will study the practical application of materials to solve engineering problems. A mixture of demonstrations, virtual simulation and hands-on building will allow for practical application of knowledge. This course will be a competition-style environment where students will utilize the engineering design process to construct solutions to various design challenges. Working individually and in groups, students should be prepared to spend days working on projects and have them destroyed in the name of testing and data collection, not to mention bragging rights for the best performing projects.

### **Module Titles:**

**Module 1:** House of Cards

**Module 2:** Cranes

**Module 3:** Skyscrapers

**Module 4:** Bridges

**Module 5:** Domes

### **Module Overviews:**

#### **Module 1:**

Students will begin the module with a cursory overview of the Engineering Design Steps and how they apply to successfully meeting the goals of design challenges posed by the course curriculum. Students will then develop an understanding of basic forces acting on all structures such as tension, compression and shear.

#### **Module 2:**

Students will develop a thorough understanding of the 6 simple machines and how they can be applied to construction. A study of crane evolution from ancient to modern times gives students the opportunity to apply their knowledge by testing various crane designs.

#### **Module 3:**

Students will gain an understanding of material sciences and techniques used in the construction of tall buildings. An examination of materials beginning with natural and culminating in cutting edge synthetic applications will allow students to see the evolution of skyscraper construction.

#### **Module 4:**

Students will identify and gain an understanding of varying bridge designs and the locations they are used based on the geography and transportation needs of the bridge. An in-depth look at truss style bridges will allow students to apply their understanding of how forces affect bridge design when live loads are applied to it.



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## **Module 5:**

Students will analyze the evolution and efficiencies of dome construction. Focusing specifically on the geodesic dome, students will investigate the possibilities of domes being used for remote locations and possible colonization efforts to the Moon and Mars.