



Buildings and Bridges 3-4 Syllabus

Course Goals

1 Understand Construction Engineering

Students learn what it means to be a Construction Engineer through examining structures, building materials and construction methods in ancient and modern times.

2 Learn Physical Principles

Students develop an understanding of geometry, forces, center of gravity and the laws of physics.

3 Develop Building Experience

Students apply their physical knowledge to build a variety of structures using Erector sets, K'Nex and unit blocks.

Course Topics

1 Ancient vs Modern Construction

Students investigate ancient and modern structures, and discuss how construction engineering has changed over time.

2 Construction Materials

Students discuss the pros and cons of various construction materials, and how to choose the right building materials for the job.

3 Force Diagrams

Students generate diagrams of their structures and balance weight, support and load forces.

4 Center of Gravity

Students learn about centers of gravity in structures, and how to account for use it to their advantage when creating their own structures.

5 Building Competitions

Students use multiple construction sets, competing with one another to create the tallest towers, strongest bridges, longest cantilevers and more.

Course Schedule

Day 1

Icebreakers and Introduction

Students begin by introducing themselves and learning about what it means to be a construction engineer.

Paper Tower Construction

Students create the tallest tower possible using only paper and tape.

Day 2

Construction Engineering over Time

Students replicate structures from various time periods using wooden unit blocks.

Historical Structures

Students replicate structures from various time periods using wooden unit blocks.

Day 3

Construction Materials/Methods

Students learn about different types of construction materials and their properties, as well as various methods of construction.

K'Nex Tower

Students build the tallest tower possible using K'Nex sets.

Day 4

Forces

Students study forces due to weight, supports and loads, and how they affect structures.

K'Nex Tower Day 2

Students build the tallest tower possible using K'Nex sets.

Day 5

Center of Gravity

Students learn about the center of gravity and how it applies to structure stability.

Overhanging Structures

Students apply their knowledge of center of gravity and compete to create the longest overhang possible.

Day 6

Trusses

Students learn about and create trusses using the Erector sets.

Day 7

Highways, Railroads, Dams and Utilities

Students examine and discuss the lesser known types of construction projects.

City Planning

Students work together to plan out an entire cityscape: downtown, suburbs, highways, railroads and power stations.

Day 8

Types of Bridges

Students investigate and replicate different types of bridges.

Day 9

Bridge Building Competition

Students use their knowledge of the different types of bridges to compete with one another to create the strongest bridge.

Day 10

Kit Cleanup

Students recount their kits to prepare them for the next session.

Final Day Activities

Students finish up the course by relaxing after kit counting and watching a documentary about construction.

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