

## Pre-Algebra Mathematics Support Curriculum

### Unit 1: Wind Power

The first unit of the summer mathematics support program asks students to design a wind turbine that will transfer the most wind energy into electricity. While learning about the design elements of a rotor, students review how to perform arithmetic with fractions, how to measure angles, and how to properly graph data sets. *Expected Time: 1 week of a summer mathematics camp, or 3 weeks during the school year (50-minute periods)*

### Unit 2: Blueprints and Models

During the first half of this unit, students learn about scale and proportional reasoning of all types. They then apply this knowledge to design and build a scale model of a wheelchair access ramp that meets the guidelines of the Americans with Disabilities Act. In the second half of the unit, students learn how to perform unit conversions, work with ratios, and solve percentage of change problems. The culminating project asks students to synthesize all of the skills they have learned to design a remodeling plan of a building to fulfill specific structural and space allocation constraints. *Expected Time: 2 weeks of a summer mathematics camp, or 6 weeks during the school year (50-minute periods)*

### Unit 3: People Movers

Railed transport systems are the practical application of concepts such as velocity, graphing, and integer operations. In this unit, students build a funicular up an incline that they analyze using the Pythagorean Theorem and give the car's position and velocity using positive and negative numbers. They also explore the shape of graphs at constant speed, acceleration, and deceleration. Finally, students design a transportation system timed to smoothly accommodate a certain volume of people. *Expected Time: 1.25 weeks of a summer mathematics camp, or 3 weeks during the school year (50-minute periods)*

### Unit 4: Safe Combinations

The rules of exponents and solving equations are the two main concepts covered in the last unit of the summer camp. In this unit, students build their own combination lock out of wood and metal washers and analyze how many possible combinations are possible. They then "code" their lock combinations in complex equations and challenge their peers to open the lock by solving the equations. *Expected Time: 1 week of a summer mathematics camp, or 3 weeks during the school year (50-minute periods)*

IN PARTNERSHIP WITH:

