

Grade Levels: 4th grade

Time: Total: About 1 hour **Explanation:** 5-10 minutes **Building:** 30 minutes **Testing:** 10-15 minutes

Brief Description of Lesson: The students will be challenged to make their own shape that they think is the strongest, along with triangles, squares, and other shapes where they can move and see how each shape has weak points.

FIU-EOW offers ways to **differentiate** to provide opportunities for all students to access the curriculum or standards. These are being provided as **suggestions**.

SCIENCE	TECHNOLOGY	ENGINEERING	MATHEMATICS
<p>Standard: Big Idea 12 SC.4.P.12. Motion of objects.</p>	<p>Standard: ISTE: 1.4: Innovative Designer Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.</p>	<p>Standard: 3-5-ETS1-3 Engineering Design Plan and carry out fair tests in which variables are controlled, and failure points are considered to identify aspects of a model or prototype that can be improved.</p>	<p>Standard: 2 MA.4GR.2. Solve problems involving the perimeter and area of rectangles.</p>
<p>Activity: The mentors and volunteers will get to use a hands on approach, allowing students to build there different shapes and putting force on the different shapes to see where the weak points are and how the shape will move.</p> <p>Definitions:</p> <ul style="list-style-type: none"> - Truss: A truss is a framework that supports something, like a roof or a bridge. - Supports: Elements of constructions that incorporate beams, columns, and other components to resist loads. <p>Steps:</p> <ul style="list-style-type: none"> - The mentor and volunteers will go over the definition of truss and supports. - The mentor and volunteers will go over the strength of shapes with the students by asking where in their everyday life do they see 	<p>Activity: The students will have to measure the angles of each shape using a digital protractor.</p> <p>Supporting Resources:</p> <p>Video on How to Use a Digital Angle Finder</p>	<p>Activity: Hook: Civil engineers are thinking about building fixing up an old city to look good again, but they have a lot of work cut out for them. They need your help to test and observe different shapes and their strengths so they know which ones are the best for their new construction.</p> <p>Problem statement: The students were given the problem to build shapes that are commonly used in civil engineering, that will help the engineers decide what shapes are best for the different builds they are designing.</p> <p>Measurable Goal: Testing to observe which shapes break with the role of your hand pushing down on it. And observing the difference of size and if they have supports.</p>	<p>Activity: Students will observe shapes such as rectangles, squares, and triangles while they are put under pressure.</p> <p>Along with measuring the angle the shapes create and their perimeter.</p> <p>After taking the measurements the students will calculate the original perimeter of all the shapes and choose a shape to make with a larger perimeter to test if it will have a similar structural integrity.</p>

<p>shapes. If needed there is a worksheet that addresses the main shapes we will be covering.</p> <ul style="list-style-type: none"> - The students will be given about 30 popsicle sticks and hot glue (to be used with mentor and volunteer supervision) - The students will be asked to make a triangle, square, rectangle, and hexagon out of the popsicle sticks (if the students are having trouble making the shapes refer them to the 'popsicle stick shapes' worksheet. - Students will use a digital protractor with the assistance of the mentors and volunteers to measure the angle the shapes create. Along with rulers to measure the perimeter. - Once the shapes have been measured students will push down on their shape and see if and where they break. - after testing their trusses they will fill out a worksheet with there observations. <p>Materials:</p> <ul style="list-style-type: none"> - Enough popsicle stickers for 20 per student - Hot glue guns - Hot glue sticks - Digital protractor - ruler 			
<p>Differentiation:</p>	<p>Differentiation: The mentors and volunteers will assist students in the use of the</p>	<p>Differentiation: With the help of some pictures students will be able to visually see</p>	<p>Differentiation: The students will have a worksheet to write their</p>

<p>Students can also learn about the strength of shapes with this worksheet.</p> <p>Strength of shapes</p>	<p>digital protractor to make sure the angles they are observing are correct.</p>	<p>how there shapes are supposed to come together.</p> <p>Popsicle Stick Shapes</p>	<p>observations of each shape and if they tried other shapes and what those shape did.</p> <p>Shape Observation Worksheet 1</p> <p>Shape Observation Worksheet 2</p>
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