FIU Center for Diversity and Student Success
FLORIDA INTERNATIONAL UNIVERSITY

Grade Levels: 3-5
Time: Two 60-minute sessions
Brief Description of Lesson: *In this activity, students will become engineers and explore forces and load distributions as they investigate the BEST way to make a bridge out of 100 popsicle sticks and glue. The students will then test their bridge to see how much weight it can hold before it breaks. Students will share their observations, using Padlet, and decide which bridge design is the best for maintaining the most weight.*

SCIENCE	TECHNOLOGY	ENGINEERING	MATHEMATICS
Standard: **3-PS2-2:** Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.	**Standard:** **ISTE: 2.4.c:** Use collaborative tools to expand students' authentic, real-world learning experiences by engaging virtually with experts, teams, and students, locally and globally.	**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.	**Standard: MAFS.3.MD.1.2:** Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units.
Activity: The teacher will introduce force and motion to her class by watching the video below. Force and Motion Video – English Force and Motion Video – Spanish As students are following the engineering design process, they will need to observe how different object weights will force the bridge to collapse.	**Activity:** During the creation portion of the engineering design process, students will have to test their bridges to see how much weight, in grams, the bridge can hold before it breaks. Students are allowed to record their test process using a computer or tablet. Students are responsible for uploading their video to the teacher-made Padlet and include a description of what the video entails and the supporting data. The Padlet will be shared with the community for real-time feedback and suggestions. **Supporting Resources:** Click here to learn more about building a Padlet. Click here to access Padlet.com	**Activity:** **Hook**: Rory just enrolled in the College of Engineering and Computing at FIU; his first assignment is to build a model bridge in his first-year seminar. Rory does not know what to do! Can you help Rory to build a bridge? **Problem:** How can we create a model bridge that is 12 inches long and can withstand holding an object that weighs 6 grams? **Measurable Goal:** Students will determine if they were successful in their project by evaluating if the bridge meets the criteria: • It connects two flat surfaces that are 12 inches apart and at least 12 inches above the ground. • Wide enough to hold an object. • Is no taller than 24 inches • Can hold at least 6 grams	**Activity:** Students will have to use a scale to weigh different objects and record their weight in grams before testing to see if their bridge could support the weight. After recording the different weights, the students will write a one-step word problem, utilizing any of the four operations, summarizing or comparing the data they have collected.
Differentiation:	**Differentiation:**	**Differentiation:**	**Differentiation:**

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Students will be given the opportunity to view the video before and after it is presented to the class. Watching the video before or after individually or within a small group will allow the students to pause the video and ask clarifying questions in a small group setting.	Students should be given the opportunity to include a description through a **voice note** or **visual representation** when they upload their video, description, and supporting data. This accommodation will elevate any challenges around writing or spelling.	When students are building, they should be allowed to reference or look at a ruler to use as a visual reference. *It's ***important to remember that timed activities can cause a lot of anxiety to students.*** Please provide a **visual clock** and remind students how much time they have left in 10-minute increments. * Differentiated Planning Pages: Worksheet 1 Worksheet 2	Differentiated recording worksheets: Worksheet 1 Worksheet 2