

**Grade Level:** Third Grade

**Time:** 60 minutes plus an addition 60 minutes for the ball to set in a refrigerator.

**Brief Description of Lesson:** Oh, no! Gaby and Rory have no ping pong ball to play with! In this fun, 60-minute lesson, students will be introduced to the Engineering Design Process and be guided through the process of developing, measuring, and possibly revising a solution.

*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><b>Standard:</b>  <b>SC.4.N.1.2:</b> Compare the observations made by different groups using multiple tools and seek reasons to explain the differences across groups.</p>	<p><b>Standard:</b>  <b>1.3 Knowledge Constructor: 1.3.c:</b>            Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.</p>	<p><b>Standard:</b>  <b>3-5-ETS1-3 Engineering Design</b>            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><b>Standard:</b>  <b>MA.4.M.1.1:</b> Select and use appropriate tools to measure attributes of objects.</p> <p><b>MA.4.AR.1.1:</b> Solve real-world problems involving multiplication and division of whole numbers including problems in which remainders must be interpreted within the context.</p>
<p><b>Activity:</b>            -In a bowl, mix the four tablespoons of warm water and four tablespoons of cornstarch.</p> <p>-Add two pinches of baking soda to the mix and stir slowly until it is dissolved. Then add two squirts of saline solution.</p> <p>-In a <b>separate bowl</b>, combine one tablespoon of glue and one teaspoon of glow-in-the-dark paint until mixed.</p> <p>-Combine both bowls of ingredients. Wait <b>1 minute</b> and watch the ingredients react together. Then begin to stir. The material will become sticky, hard, and slimy. But don't worry- this is supposed to happen!</p> <p>-Mix until slime starts to form. Continue to add additional saline</p>	<p><b>Activity:</b>            Students will showcase their slime balls on Flip which used to be named Flipgrid, explaining their process and if they met their measurable goal. Students will be expected to comment on their classmate's videos providing a piece of feedback.</p> <p><b>Supporting Resources:</b>  <a href="#">How to Use Flip (Flipgrid) for Teachers</a>  <a href="#">How to Use Flip for Teachers in Spanish</a></p>	<p><b>Activity:</b>  <b>Skill Being Taught:</b> Engineering Design Process</p> <p>After the teacher provides the <b>hook</b> and <b>problem</b> to the class, the teacher will then play the video supplied by SHPE. In the video, the team will introduce the engineering design process and guide the students on how to solve the problem.</p> <p><b>Student Practice:</b> Students will:            1. <b>Ask:</b> Define the problem            2. <b>Imagine:</b> Brainstorm possible solutions            3. <b>Plan:</b> Draw a plan            4. <b>Create:</b> Make it and Test it!            5. <b>Improve:</b> Based on their tests, how can students reflect and improve their creations.</p> <p><b>Hook:</b> Gaby and Rory went to play ping pong after school, and they</p>	<p><b>Activity:</b>            During the create portion of the engineering design process, students will have to identify the appropriate tool to measure whether the ball can bounce a minimum of 23 cm when released at the height of 30 cm.</p> <p>Student's will document their findings on their Data Records worksheet.</p>

<p>solution until you reach your desired consistency.</p> <p>-Remove the slime from the bowl and roll it into a ball. The more you roll it, the less slimy it will become. It will continue to harden but will still be squishable.</p> <p><b>-Place the ball into the refrigerator for 1 hour before bouncing!</b></p> <p>*The more you knead and play with your slime, the firmer and less sticky it will become!*</p>		<p>suddenly realized that the ping pong ball had gone MISSING! They have tried to use marble, a tennis ball, and a baseball, but none worked! They need your help! The average height ping pong ball can bounce is 40mm. The bouncing size required by federation standards is at least 23 cm for free-falling table ping pong balls from 30 cm.</p> <p><b>Problem:</b> How can we create a ball that meets the Ping Pong Ball Federations standards?</p> <p><b>Measurable Goal:</b> Students will determine if they are successful if the ball can bounce a minimum of 23 cm when released at the height of 30 cm.</p>	
<p><b>Differentiation:</b></p> <p>Students may have tactile sensory challenges, and it may be best to provide <a href="#">plastic gloves</a> when holding and forming the ball or during the entire experiment, along with <a href="#">noise-canceling headphones</a> because the classroom environment may get loud due to excitement.</p>	<p><b>Differentiation:</b></p> <p>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.</p>	<p><b>Differentiation:</b></p> <p>When students are creating, they should be allowed to reference or look at a ruler to use as a visual reference to better understand the height their ball must reach.</p> <p>*It's important to remember that <b>timed activities can cause a lot of anxiety to students.</b> Please provide a <b>visual clock</b> and remind students how much time they have left in 10-minute increments. *</p> <p><b>Differentiated Planning Pages:</b></p> <p><a href="#">Planning Page !</a>  <a href="#">Planning Page @</a></p>	<p><b>Differentiation:</b></p> <p>Students will be given the make-it-and-test-it worksheet that best suits their learning needs.</p> <p><b>Differentiated Data Records Worksheets:</b></p> <p><a href="#">Data Records Worksheet !</a>  <a href="#">Data Records Worksheet @</a></p>

