

Lesson Title: Build a Levee STEM Challenge		
Grade Level: 5	8:00 – 8:50	Week of February 29 <sup>th</sup>
<b>Standards:</b>  <b>Science:</b> <b>S5CS6. Students will question scientific claims and arguments effectively</b> b. Identify when comparisons might not be fair because some conditions are different.  <b>S5E1. Students will identify surface features of the Earth caused by constructive and destructive processes</b> c. Relate the role of technology and human intervention in the control of constructive and destructive processes. Examples include, but are not limited to flood control, (dams, <i>levees</i> , storm drain management, etc.)  <b>Math:</b> <b>MCC.5.MD.1</b> Convert among different sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversations in solving multi-step, real world problems.		
<b>Lesson Essential Question:</b>  How do levees help control the constructive and destructive process of flooding? How do I convert among different sized standard measurements?	<b>Vocabulary:</b>  Flood Levee Dam Flood control	
<b>Lesson Materials</b>  Water source Empty Gallon Jug to hold water for testing Plastic Bins or Plastic Shoe Boxes Sand (about 1-2 cups per team) Craft sticks Sponges Cotton balls Zip-top bags Rocks Duct Tape Ruler	<b>Lesson Assessment:</b>  Student STEM Journal Teacher Observations	
<b>STEM Challenge Overview:</b> Students will build a levee to prevent water from one side of plastic container from reaching the other side.		
<b>Teacher Background:</b>  Students work in groups of three or four people. Access to water is necessary for this lab. If water is not available, use pre-filled gallon jugs to test levees.  This lab works well outdoors but can be performed indoors if necessary.  Lab Length - 1 to 2 days, 45 or 50 minute segments		

INSTRUCTION	
<b>1. Ask/Engage</b> <b>Day 1 (5 min)</b>	
<p>Show video of Flooding in Washington: <a href="http://youtu.be/Z8wgkg3sYUE">http://youtu.be/Z8wgkg3sYUE</a></p> <p>Discuss with the class the ways in which humans use technology to control destructive forces of flooding. Discuss examples from the video or from previous books / experiences.</p>	
<b>2. Imagine/Brainstorm</b> <b>Day 1 (5-10 min)</b>	
<p>Introduce the challenge and provide students with the STEM journal pages. Allow time for independent brainstorming and planning. Students should think about what materials are available and which to choose for building their levee.</p> <p><b>Challenge:</b> Design and build a levee in a plastic box which will prevent rising flood waters from reaching the opposite side of the box.</p> <p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1. The levee must be contained inside the box</li> <li>2. The levee must prevent flood waters from reaching the opposite side of the box.</li> <li>3. The levee must be constructed from approved materials</li> <li>4. Measure each side of the levee using two different types of measurement. For example determine both the cm and m side measurements. Determine the area and perimeter of the levee.</li> </ol> <p><b>Constraints:</b></p> <ol style="list-style-type: none"> <li>1. Materials (approved and provided by teacher)</li> <li>2. Time (you must build the levee in the time provided)</li> </ol>	
<b>3. Plan/Design</b> <b>Day 1 (10-15 min)</b>	
<p>Each student presents their ideas to their team. Student teams collaborate to develop a final design plan. Students draw and label their final design plan and make a list of needed supplies.</p> <p>Groups can design their levee using a drawing app or make a video of their final product and narrate what they did. They may take pics of their levee and use the pics for Picwall to create a pamphlet about their levee.</p>	
<b>4. Create / Test</b> <b>Day 1 (25 minutes)</b>	
<p>Student teams build their design according to their design plan. Student's test their design plan using the gallon jug and pour water until the levee fails, when water reaches the other side of the levee. It is helpful to record how much of the gallon each team used by marking the jug with a permanent marker at the point the levee failed. Label with a team number. You may wish to accurately measure the amount of water each levee holds (this will take more time) but labeling the jug is a quick reference to which levee held the most water. Allow students to record data.</p>	
<b>5. Evaluate/Improve – and repeat Steps 1-5</b> <b>Day 1 (10 – 20 min)</b>	
<p>Students evaluate their design for success. Did it meet the established criteria? Did their final design match their planned design? How would students improve their design? If time allows, provide students an opportunity to redesign according to their improvement plans.</p>	

# Build a Levee STEM Challenge

## 5<sup>th</sup> Grade



### Challenge:

Design and build a levee in a plastic box which will prevent rising flood waters from reaching the opposite side of the box.

### Criteria:

1. The levee must be contained inside the box
2. The levee must prevent flood waters from reaching the opposite side of the box.
3. The levee must be constructed from approved materials
4. Measure each side of the levee using two different types of measurement.  
For example determine both the cm and m side measurements. Determine the area and perimeter of the levee.

### Constraints:

1. Materials (approved and provided by teacher)
2. Time (you must build the levee in the time provided)

### Materials:

Sand	Rocks
Plastic Bag	Sponges
Craft Sticks	Cotton Balls
Duct Tape	Ruler