LCM Formal Loop

<table>
<tr><td colspan="2">LCM Lesson Plan: Stream Velocity and Erosion of Streambed Materials
Standards: Science A7, B1
Math A2, A4, A6
Cultural E2
Science concept: Students will understand the relationship between water velocity and erosion of different materials.</td><td>Name

Grade level</td><td>Georgia Tompkins Academy Charter School
Middle/High</td></tr>
<tr><td></td><td>Process Skills</td><td>Materials</td></tr>
<tr><td>Gear- Up: Set up the stream table with 2 streams made with white PVC pipe cut in half lengthwise. Color the 2 stream sources different colors. Set the stream sources at 2 different levels, one high, one low. Ask the students to predict which stream will reach the “lake” collection tub first. Release the water at the same time and observe which stream “wins” the race. Ask the students to compare and contrast the 2 streams.</td><td>Observation
Communication
Prediction</td><td rowspan="2">Stream table, 2 water sources dyed 2 different food colors, collection tub, clear plastic tubing or PVC pipe cut in half lengthwise for the streams’ course.

Sand, gravel of different sizes, stream table, water source, 2 liter soda bottles, collection tub, sugar cubes or plastic cubes, ruler/meter stick</td></tr>
<tr><td>Explore: In teams of 2-4 have the students design a stream valley in their stream table with one of the materials. Have them place houses (cubes) or towns along the streambed. Have students sketch the valley with structures identified in aerial view (from above). Have the students predict what will happen when they release the water from different levels. Let the students explore the results of releasing the water from different elevations above the “headwaters” of the stream table. Record observations.</td><td>Observe
Measure
Construct
Predict
Mapping</td></tr>
<tr><td>Generalize: Discuss what happened. Were the results as expected? Why or why not? How could you make this a “fair” experiment?</td><td>Communication
Inference</td><td>Vocabulary
Velocity
headwaters
elevation
streambed
erosion
sand
gravel,</td></tr>
</table>

Experiment: Design a "fair" experiment using the materials provided to determine which material results in the least erosion when water is traveling at a high velocity through a streambed variable. Have students sketch an aerial map of the area before the flow. Have students record their strategy for the selection of materials, streambed design and placement of structures. Possible experiments might include variations in streambed materials or degree of slope of the streambed.	Observation Inference Data collection Mapping	
Interpret: Have students sketch an aerial map of the results. In a brief presentation to the class ask students to explain their strategy, what happened and if their results were or were not what they expected.	Observation Inference Mapping Communication	
Apply/Assess: Of all the teams' results, which material was least resistant to high velocity stream flow? Which was most resistant? In what situations could this experiment's results be useful? What current event might relate to this activity?	Communication Inference	
Extensions: Math- Time the flow of water from release to collection in relation to the elevation of the water source. Graph the results. Science- Design a dam that could prevent erosion and destruction of structures. Introduce gradient. L.A.- Research major floods, dam projects, habitat destruction due to dams.	Collect data Graphing Communication Research Measurement	

Scoring Guide

You saved the town!	The experimental design is fair with one variable, all maps are included, all maps are aerial view and neat, data and measurements are neatly recorded, organized and accurate, presentation is clear and audible.	100-90%
You saved your house!	The experimental design is fair, maps are included and aerial, but sloppy, data is readable and accurate, presentation is audible but vague.	89-80%
Your house is full of water and mud!	The experimental design has more than one variable, maps are missing or are not aerial view, the data is poorly organized and/or incomplete, presentation is inaudible or vague.	79-70%
You've lost everything!	The experimental design is invalid, maps are missing or not aerial, data is not readable and/or incomplete, presentation is inaudible and vague.	69-60%