



Drexel-SDP GK-12 LESSON

- ***Bridge Building***
- *Engineering Module*
- Subject Area (Unit): ***Engineering***
- Concept: Material Strength, Civil Engineering
- Objectives: *Students will build a bridge out of K'nex to be weight tested, the bridge must meet several constraints on size and the amount of material used.*
- PA Academic Standards: *3.1.7ABCE, 3.2.7ABC, 3.4.7AC, 3.6.7BC, 3.7.7E*
- Grade Level: **6**
- Setting/Group Size: Classroom split into smaller 3-4 person groups.
- Duration/Time Required: ***3 60 minute sessions***
- Materials List: K'nex pieces – the number of pieces available should determine the required dimensions of the bridge.
- Context: *This is a standard first year engineering student exercise that begins to build the skill set necessary for more complex engineering tasks. The bridge provides a excellent context to discuss geometry and strength, important considerations that factor into engineering design as well as beginning to gain perspective on how things are constructed.*
- **Methods and Procedure:**
Begin by discussing the concept of a bridge, what are some famous bridges and what do they look like. Ask the students to build a bridge to hold the maximum amount of weight possible

in their groups. Based on the amount of K'nex available several rules can be laid out such as a minimum span for the bridge, a maximum weight of the bridge itself and a minimum height for the inner portion of the bridge.

Encourage the students to test different structures before beginning construction and to draw some design ideas that they think will work best.

After some groups begin finishing, allow them to come up for a initial weight test so they have the opportunity to make improvements before the final testing.

Finally after each group is finished, have the class come up and weight test each bridge to find the maximum weight it can hold. Be clear to the class about what qualifies as broken before beginning to avoid any controversy.

- *Assessment: Once the winner is determined, ask the students to place each car in a place where they can be inspected. Have each student write up a short paragraph that discusses why their bridge did or did not win, what features on the winning bridge allowed it to be strongest. If they could design one more bridge, what features from other bridges would they incorporate into theirs and why.*
- **Keywords: Civil Engineering, Material Strength**
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