



STRENGTHEN A PAPER BRIDGE

Courtesy of: Engineers Nova Scotia

In this quick activity, learners will test how many pennies a flat paper index card bridging the gap between two stacks of books is able to support. Then, learners alter the structure of the same card by folding it accordion-style and retest by again stacking pennies on top. Learners look for a relationship between the number of folds and the number of pennies the card can hold by creating a scatter plot.

Materials you will need:

- Books for stacking
- Index Cards
- Pennies

Instructions

Introduce the activity, explaining the goal is to build the strongest possible bridge from one index card. Demonstrate how many pennies a plain index card can hold and write that number down on the white board. Explain that they can manipulate the index card but cannot add anything to it.

Give each girl books, a few index cards, and some pennies.

Indicate how long they have to design the strongest bridge.

When the time is up have girls raise their hands if they think they have the strongest bridge.

Ask the girls who raised their hands to count how many folds they made in their bridge and how many pennies it could hold. Add these to the white board.

Ask the group the following questions:

1. What did you do to your bridge?
2. What shape did the folds make?
3. What made your bridge stronger?
4. What do you notice about the numbers on the board?
5. Did you notice anything else about building the bridges?





Address the following learning points:

The more folds = the stronger the bridge.

“If there is a single most important shape in engineering, it is the triangle. Unlike a rectangle, a triangle cannot be deformed without changing the length of one of its sides or breaking one of its joints. In fact, one of the simplest ways to strengthen a rectangle is to add supports that form triangles at the rectangle's corners or across its diagonal length. A single support between two diagonal corners greatly strengthens a rectangle by turning it into two triangles. Triangulation of material, adds strength by eliminating lateral movement.” - Schoology

