



Curiosity Guide #207

Bridges

Accompanies Curious Crew, Season 2, Episode 7 (#207)

Paper Arches

Investigation #3

Description

Find out how to strengthen a bridge by changing its shape.

Materials

- 2 full cans of soup
- Poster board cut into 4 by 11-inch strips
- 8 or more large erasers
- 11 by 17-inch paper
- Pencil
- Ruler

Procedure

- 1) Place the soup cans on the 11 x 17-inch sheet of paper so that there is 6 inches between the cans.
- 2) Trace around the base of each soup can in case they get moved.
- 3) Lay one strip of the poster board flat across the two cans like a beam-style bridge spanning the 6 inches.
- 4) Predict how many erasers the bridge can hold before falling.
- 5) Place the erasers one at a time on the paper. Note how many erasers the flat strip of poster board holds.
- 6) Now curve a second strip so that each end is wedged beside the can. The second strip should form a curve.
- 7) Predict how many erasers the arch bridge can hold.
- 8) Test your prediction.

- 9) Note how many erasers the curved strip of poster board holds.
- 10) What did you notice? Which was stronger?

My Results

Explanation

The shape of the arch bridge adds strength to its top. The load does not push straight down like it did in the beam-style paper bridge. Instead, the shape spreads the load and compression force along the curve of the paper and back to the soup can supports. Arch bridges are made of stone, steel and concrete, but the oldest stone ones are nearly 2000 years old and are still standing.

Something to find on the internet: Search for "Alcantara Bridge."
Click on Images.

The Romans first built arch bridges nearly 2000 years ago out of stone and discovered their amazing strength and durability. This is the Trajan Bridge in Alcantara, Spain. It was named after the Roman Emperor who had the stone bridge built over the Tagus River in the year 105 AD. The bridge has an inscription on the tower that says, "I have built a bridge which will last forever." That is one impressive bridge!

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