Tight Bridges: Teacher’s Guide

Materials Needed:
3 Pieces of blank x 4" Bristol Board
String
Rubber bands
A brick

Directions for bridge construction:
Before beginning the activity you must assemble the demo model. Attach the two bridge posts to the base with the included screws. Place a piece of bristol so that it is connecting the slots between the posts. Now attach rubber bands to the posts and the bristol in a manner resembling a suspension bridge. This will serve as a demo model. When it is time for the children’s activity remove the rubber bands so that they can replace them with string.

Activity

1. Talk with your students about bridges and find out what they know.
   Sample questions:
   + What are some different types of bridges?
   + How do you think the bridges are supported?
   +

2. Give the students the worksheet and go over it with them.

3. Set up the demo. Show the students that when a weight is placed on the bridge, the rubber bands holding the bridge up are in tension. Ask the students for their observations.
   + Try changing the number of rubber bands holding the bridge up for the same weight to show how the decreasing amount creates more tension for the rubber bands left.
   + Change the position of the rubber bands in relation to the center and ends of the bridge to show how tensions is effected.

4. Take out the brick and give them the following scenario:
   Mr. Brick has been lying around for most of the day not doing much in general. He suddenly gets the urge to visit downtown Pittsburgh to visit the Point. He starts his travels, but quickly comes across a half-finished bridge that he must cross. All he has is some string in his pocket, which he was planning to use later on to weave into a net to go fishing. Can you enable the bridge to support Mr. Brick with the least amount of string?

   Place the brick in the middle of the bridge to show how the bridge can not support its weight.

5. Split the students into 3 groups and give each group a bridge and pieces of string. Give them a time limit and allow them to try different ways of supporting the bridge, making sure that they record how much string they use. When all three groups are finished, test each of the bridges.

6. Follow up questions:
   + What area is the most crucial in needing support?
   + How was the tension distributed in each of the bridges?
   + Which bridge is the most stable and why?
   + If you were asked to build a bridge for Mr. Brick and his wife, how could the bridge be better supported?