

Building a Bridge

4th or 5th Grade

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Benchmark and SLC#

SLC 7: Students will select appropriate resources and tools to make accurate observations to gain desired results given the stated conditions (i.e., if a desired result is to build an outdoor greenhouse to start seeds, the design would have to promote the correct amount of sunlight.)

Objectives:

To build a bridge out of an index card that will support the largest amount of mass.

Materials:

For each group:

- 3" X 5" index card
- Several (2 or 4) textbooks to place the index card on
- Ruler
- Pennies or large washers

Initial Demonstration/Initial Observation:

Have set up at the front of the room a couple books stacked on top of one another with a space of 6" in between them. Place the index card over the gap and begin to set washers on top of the card. Have the class observe what happens as more weight is added to the card.

Target Observations:

- The card bends in the middle
- The more washers placed on the card the more it bends
- After several washers are added, the card touches the table

Target Model:

-The index card alone is not strong enough to support the mass of the washers
-The index card can be reinforced by folding so it has enough support to hold a large amount of mass.

Procedure:

Explain to the class that it is their task to come up with a bridge that can support the largest amount of mass (washers). They will need to work as a group to come up with a solution. They will only be given the materials shown and will not be allowed to use anything else (like tape or scissors) and the card must remain on top of the books, not underneath the front cover. Their bridge must span a distance of 6". They will be given 20 minutes to work on their bridge. After that time the bridges will be judged by placing

washers one by one on top of the bridge (in the middle stacked one on top of another) until it falls. Split the class up into groups of 3 or 4 and let them work together to come up with a solution. If the class is having problems you may want to ask them how they can fold their card to make it stronger. (An accordion style fold will provide the most support).

Target Model:

- The index card alone is not strong enough to support the mass of the washers
- The index card can be reinforced by folding so it has enough support to hold a large amount of mass.
- Folding the index card like an accordion provides the most support.*