

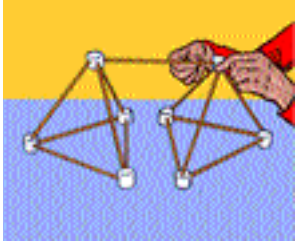
# Instructions: Spaghetti Bridge

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## objective

Investigate the difference between the strength of bridges made from flat and round building materials.



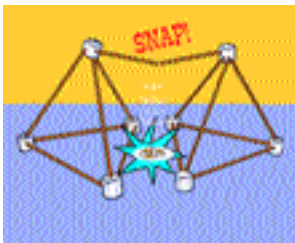
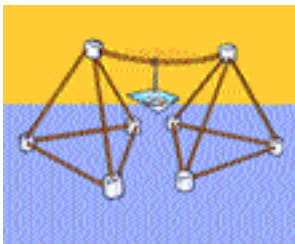
### What You Need

- 8 marshmallows
- 18 pieces of raw spaghetti
- 4 pieces of raw linguine (spaghetti and linguine should be same diameter)
- 1 paper clip
- 1 envelope and a scissors (to make hanging basket for coins)
- approximately 40 coins
- paper and pencil to record observations



### To Do and observe

1. Cut off the lower corner of the envelope for your coin basket.
2. Unbend one end of the paper clip to make a hanger and poke it through the top of your coin basket.
3. Construct two pyramids of equal size with your marshmallows and spaghetti.
4. Connect the pyramids with a single strand of spaghetti.
5. Hang your coin basket from the bridging piece of spaghetti.
6. Add coins one at a time to the basket.
7. Record the number of coins in the basket at the time the bridging spaghetti breaks.
8. Repeat the experiment three more times to get an average number of pennies needed to break the spaghetti bridge.
9. How do you think the results will change if you use linguine for the bridge instead?
10. Test your hypothesis by repeating the experiment with the linguine as the bridge.
11. Was the round (spaghetti) or flat (linguine) shape stronger?



## What's Going on

Circles are among the strongest shapes in nature. External and internal stress distributes itself evenly throughout a round structure. Spaghetti has a shape like a cylinder, while linguini is shaped like a flattened rectangle. A piece of spaghetti has the same strength in any direction it is bent. Linguini will bend more easily in one orientation than another.

## Instructions: Spaghetti Bridge

Be sure to experiment using pieces of spaghetti and linguini with similar diameters. And try orienting each piece of linguini in the same direction; this will produce a more uniform strength throughout the structure.

### Tip



- Have your class experiment with constructing different shapes using linguine and spaghetti. Which shapes work better with which designs?

### Cool Links

Bridge Building @ the Deutsches Museum

[http://www.deutsches-museum.de/ausstell/dauer/bruecken/e\\_brueck.htm](http://www.deutsches-museum.de/ausstell/dauer/bruecken/e_brueck.htm)

Other Experiments on TryScience

[www.tryscience.org/experiments/experiments\\_home.html](http://www.tryscience.org/experiments/experiments_home.html)