



Background:

There are many types of bridge designs engineers can choose to span a horizontal distance. The engineer must consider the dimensional requirements, loading, and materials before selecting a bridge design. The objective of this challenge is to design and construct a lightweight bridge, made of pasta, to span a horizontal distance of 40 cm and support as much load as possible.



Specifications: *(Any project not meeting specifications will not be allowed to compete.)*

1. Each school may have up to five teams (max 3 per team) or individuals participating. Each design must be unique and must clearly be labeled with the names of each team member and school. A student may only participate once. At least one team member must be present for their team's evaluation.
2. The competitors may only use raw, uncooked, store-bought pasta (any variety) and glue. Do not use glue which produces dangerous fumes.
3. The bridge must be a maximum of 60 cm in length, 20 cm in width, and may not exceed a mass of 500 g. There is no height requirement.
4. The bridge must include a solid roadbed to fit an average sized hot wheels car that spans the entire length of the bridge. There must be an attachment point in the center of the roadbed to connect a 3 inch snap clip fastener (carabiner clip) that will be used to provide load to test the bridge's capacity.
5. All excess glue must be removed. The bridge cannot be affixed in any way to the testing surface.
6. The load supported by the bridge will be dictated once the bridge fails and the load to test the bridge touches the ground.
7. The winning team will have a bridge, which minimizes mass and maximizes capacity. Note, a bridge that supports less load may score higher than a bridge that supports more load due to minimizing mass.

The Competition:

1. Bridges must be brought to the competition fully assembled. Materials for testing (snap clip fastener, loads, etc.) will be provided on the day of the event.
2. Dimensions of the bridge will be validated prior to the competition by placing the bridge in a box with inner dimensions slightly larger than 60 cm x 20 cm.
3. The formula below will dictate the score, assigned to each team:

$$Score = (mass_{supported}) / (mass_{bridge})$$

4. Once the bridge is placed for testing, students will not be able to interact with the bridge in any way other than applying the loads.
5. In the event of a tie, a first tie break of greatest mass supported will be used. If a tie still stands, the second tie break will be a coin toss.