Pasta Bridges

Grades: 2nd and 3rd
Teams: 1-2 participants per team
Duration: 40 minutes (with a build time of 20 mins)
Supervisor: Sarah Gelsanliter

Summary Description

This event will consist of two parts. During the first part of the competition, the teams will construct a bridge using dried pasta and PlayDoh. In the second part of the competition, the students will load their bridges with cargo (nickels) until the point of failure. The bridge capable of carrying the most weight will win.

Changes from Last Year

Mini marshmallows have been replaced with PlayDoh.
Cargo (weights) have been changed from pennies to nickels.

Concepts Covered

Engineering, Design, Construction, Structural Forces, Gravity, Weight, Load

Rules/Competition Format

1. Teams will be given
    a. 10 g of PlayDoh
    b. 20 strands of Barilla long pasta (spaghetti OR linguine OR fettuccine). The long pasta will not be known prior to the competition. All teams will be given the same type of long pasta;
    c. A variety of up to 8 pieces of pasta shapes of their choice. The selection will not be known prior to the competition but may include elbows, corkscrews, penne, rigatoni, ditalini bowties etc. Shapes will be sorted by type and each team will be called up separately to choose their 8 pieces.

2. Teams must build a bridge using only these materials. The teams will inspect their pasta prior to the start of the event and be given replacements if a piece is defective. Teams do not need to use all their materials.

3. The bridge must be at least 2.5 cm high at its highest point (measuring from the top of the wooden bridge support). The bridge must also be at least 2.5 cm in width. Students will have a ruler available to them.

4. The gap that the bridge will span is 12 cm in length. At the ends of the gap will be wooden 2x4 sections. Spacers will be attached between the 2x4s to ensure the 12 cm spacing is uniform and maintained throughout the competition. A picture of the wooden 2x4 bridge support platform the students will be building on is included in the supplemental guide.

5. Each team will have space at their own table on which to build their bridge. The wooden 2x4 bridge support platform with spacer will sit freely on a surface - it will not be glued or otherwise attached to the table.

6. PlayDoh may be used to join the spaghetti pieces and/or attach the spaghetti pieces to the wooden 2x4 supports. PlayDoh may be used in a position where it will help hold and stabilize the loading cup. The loading cup is a 9 oz clear plastic cup.

7. Water and a limited supply of paper towels will be available in the room, should the students need them. The paper towels cannot be used to form any part of the bridge structure. The cup which will hold the cargo will be available to the students during the building phase of the competition.

8. The bridge may not be braced against the supports from underneath. It should only contact the top surfaces of the supports and cannot touch/be braced by the "ground." This is a failure condition, as described below.

9. Prior to loading the bridge each team will provide a written estimate of the number of nickels their bridge will support. This information will be used in the event of a tie between two or more teams. (see Tiebreaker info below)

10. When the bridge is finished, it will be loaded until failure. Failure is defined as not being able to maintain the load. This may occur if the bridge breaks or tumbles from the support spacers, if the bridge bends enough that it makes contact with the "ground", or if the load slides off the bridge. If some pasta pieces break during loading but the cup remains on the bridge and the bridge is not touching the "ground", students may continue to load it until failure.

11. Students will place the loading cup on the bridge and load the cargo – nickels. The bridge will be loaded from its highest point.

Scoring

The bridge holding the most nickels wins.

Tie Break Criteria

If there is a tie for bridge capacity,

Tiebreaker 1
Closest estimate to the actual load amount

Tiebreaker 2
Narrowest bridge

Materials Distributed by WESO

None

Materials to be brought to competition

None

Event Questions

Please go to https://wesoscience.org/events/ for information on how to submit questions about this event to the supervisor.