

Team Challenge Brief – You shall not Pasta!

Walking through the desert you come across a large, seemingly impassable ravine. It stretches from horizon to horizon and you can see the oasis of water on the other side. Tired from pulling all of your worldly possessions in your large pull-cart, you ponder how you'll get across. Just before you reached the ravine you remember a large pile of different shaped elements lying in the desert sand. Maybe these will help me get across! Using the rope (the glue) you've collected over the long journey, and these different shapes, can you build a lightweight bridge to slide over to the other side? Get you and your cart across safely!

Materials

- Pasta*
- Elmer's or Tacky Glue
- Epoxy

*Pasta noodles of the following variety may be used; nothing outside of these types of noodles.

- Bucatini
- Fusilli
- Spaghetti
- Linguine
- Penne
- Fiori (Careful about the gap requirement if used for decking!)

Bridge Building

The object of the team challenge is to design and build a bridge that will carry the heaviest load while meeting specifications. All bridges will be loaded until they fail.

Rules

1. The bridge is to be built from pasta and glue (see materials list for acceptable types of pasta and glue). Construction may not contain any other materials. The pasta may be carved, notched, steamed, boiled, and curved. The bridge may not be painted or stained. No piece of spaghetti, bucatini, perciatelli, or linguini may have glue applied its entire length to fix it to another piece of spaghetti, bucatini, perciatelli, or linguini.
2. The bridge should be free-standing and must span two level surfaces which are 20 inches apart for 9 – 12th grade and 10 inches apart for 5 – 8th grade. The maximum width of the bridge cannot exceed 4".
3. The support for the bridges will be from the top of the level surfaces. The edge of the surfaces may not be used in any way for support.
4. The bridge must include a decking of spaghetti to provide a suitable road surface at least 2 inches wide across the full span of the bridge.

Three conditions must be met for the deck:

- a) gaps in the bridge deck are not to exceed ¼".
 - b) a block of wood 2" X 2" X 4" representing a car must be able to move along the length of the decking unobstructed from end to end.
 - c) the deck of the bridge must not be more than 2" above or below the ends of the bridge for any point along its length.
5. Maximum length of the bridge will be:
 - a) 26" for 9 – 12th grade. (3" on either side of the 20" span for support)
 - b) 14" for 5 – 8th grade. (2" on either side of the 10" span for support)

6. Maximum vertical depth of the bridge from the highest point in its structure to the lowest cannot exceed:
 - a) 10" for 9 – 12th grade
 - b) 5" for 5 – 8th grade
7. Maximum weight of the bridge shall not exceed 750 g or 1.6lbs.
8. You must include a space for a loading platform from which the weights will be hung. This space will consist of a hole in the decking of a minimum of $\frac{1}{2}$ " and a maximum of $\frac{3}{4}$ " in diameter through which a $\frac{3}{8}$ " inch eyebolt will be passed from the bottom of the bridge and inserted through an upper 1.5" square of plywood and secured with a wing nut. An s-hook and metal rod will hang from the eyebolt to support the load applied to test the bridge. During loading, if the bridge twists in such a way as to cause the bridge to touch the rod at any point other than the eye-bolt, thus lending additional support, the bridge will be disqualified.
9. At the Maker Faire, bridges will be loaded with increasingly greater amounts of weight until they fail. After a bridge fails, team members are responsible for cleaning up the pasta from their bridge.

About the Challenge

Here at the Shasta County Mini-Maker Faire, there are no winners and losers. Anything that's cool is fair game, though sometimes it's especially cool to try to meet a tough design challenge with a team. The goal is to push yourself and your team to be the best you can be, not compete against others. Thanks to the generosity of our many sponsors, we plan to offer a free Maker kit for the first 3 teams from any given school or program that registers before October 1, 2016 to take home. In addition, there will be a number of awards given ranging from "strongest" to the "most creative" to the "most spectacular fail".

Teams should expect to bring their bridges to the Maker Faire between 10 am and noon on Saturday, November 12th. When you come to the Shasta County Mini-Maker Faire, you will test your bridge and get feedback from the architects at Trilogy. And please stick around to see what other fabulous designs others created. We hope that the feedback you receive is useful and inspires you to keep making. Even if your bridge isn't finished on November 12th, we still hope you come to the Maker Faire, share what you did with us, and get feedback. Specific information will be sent to each team via e-mail by November 1, 2016.

Team composition

1. Teams should be comprised of 2-6 members. Mixed age teams are welcome. Younger participants are welcome so long as at least one of their fellow team mates is in 5th grade or above.
2. The oldest team member's current grade will determine the design criteria you need to follow. Thus, if your team has two 9th graders and two 7th graders, you would be need to follow the design criteria for 9 – 12th grade.
3. Sorry, high school graduates are not permitted as team members — our goal is to encourage young makers to be creative and to reach for a challenge as independently as possible. Adults are encouraged to provide materials and space to work, facilitate conversations, teach basic skills (such as how to mix and apply epoxy) and design principles (such as the difference between truss and suspension bridges), and give lots of moral support. BUT please give teams the chance to try and fail and try again on their own.