



JCC Spaghetti Bridge Building Competition

2019 Competition Rules



Objectives: A spaghetti truss bridge building competition during which high school teams compete in a timed head to head competition to build a bridge that will have the best load to weight ratio.

Eligibility: Recognized high schools may sponsor teams. Each team is to be composed of no less than three (3), nor more than four (4), students, all of whom must be in good standing of the sponsoring school. A student may be listed and participate on only one team. An alternate team member, meeting the qualifications, may be listed on the entry form in case of the need for an emergency substitution prior to the beginning of the competition. Once the competition begins, no substitutions will be allowed.

Registration: Contact [gmiller@sunyjefferson.edu](mailto:gmillers@sunyjefferson.edu) (coordinator) with the number of teams for your high school and their respective team name(s). Coaches will then be directed to the online Registration Form, at sunyjefferson.edu/spaghettilbridge. Contact Genn Miller by email or phone 315-786-2388 for help.

The Poster: Each team should produce a poster prior to competition, and bring it to the competition. The poster (typical posterboard size) will be used to identify each team's building area and must include the team's name, school name, individual members' names, and coach's name. Posters will be judged on necessary information, creativity, and magnetism.

Registration Fee: \$20 per team; pay to "JCC FSA Engineering Events" upon arrival at the competition.

Materials Permitted: The completed bridge may contain no other materials than the "spaghetti" and "glue" which will be applied with a hot glue gun. Each team will be provided with one (1) unopened, sealed box of new, major brand regular spaghetti and eight (8) mini-glue sticks, as well as two electric mini glue guns. No spaghetti or glue other than that provided will be allowed.

Tools Permitted: Each team will be permitted to bring and use a limited number of tools, which they may use to assist them in the construction of the bridge. Tools permitted include scissors, needle nose pliers, tweezers, and clamps as well as other similar devices. Plans from *West Point Bridge Designer 2016* and/or building templates may be pre-drawn and then used as tools to assist with building during the competition. *No power tools or devices (other than the supplied glue guns) that generate heat will be allowed.*

Design Requirements and Building Phase:

- An open truss bridge design must be utilized, created, and designed.
- The maximum amount of spaghetti and glue are limited as stated above.
- The bridge shall be free standing (not attached to the loading table in any way).
- Each bridge will be designed to sit on abutments with **19.5 inches clear span**.
- A standard, wood #2 pencil will be supplied by the judges prior to 10:30am. This pencil must be incorporated into the bridge so that the pencil is located within the center third of the span. The exact location of the pencil is up to the team. A bucket will be attached to an S-hook placed on the pencil to hold the loading weights in the testing phase. Clearance should be provided such that the hook can be placed on the pencil without obstruction from other truss parts. The pencil must rest on both sides of the truss.

- Individual bundles of glued spaghetti may contain no more than six (6) strands. These six (6) may be arranged in any configuration.
- Support for the bridge shall be from the top of the level surfaces, and their edges may not be used for support in any way. Supports will be flat boards and cannot be moved to accommodate any particular bridge.
- No part of the bridge may be more than 2 inches below the support platform's surface.
- Teams will have 1.5 hours (10:00am to 11:30am) to design and construct their bridge.
- Anchorage of the ends of the bridge is not permitted.
- The bridge deck must be an open span. In other words, a car must be able to drive through your bridge from side to side. This is tested by inserting a 3" high x 5" wide piece of foam through the length of your bridge resembling side by side vehicles. Be sure that your bridge will allow this foam to pass through by ensuring appropriate clearance. Foam pieces will be available during the building phase for teams to check their structures.
- **The bridge must have identical, vertical sides containing no less than four (4) bottom chord joints.** The bridge must consist of purely two-force members. In other words, there may be no continuous spaghetti through a joint or connection. Wherever spaghetti members are adjoined, the spaghetti must be broken there and glued. (Pictures and further clarification will be given to coaches once their team is registered).

Bridge Completion: Subject to the rules stated above, the organization of the building process and the actual management of the construction of the bridge will be left up to the individual teams. During this process, the teams are should **stay at their building station**. At 11:30am, the bridge will be weighed by the team and at least one (1) judge and one (1) SUNY Jefferson committee member. Once weighed, no alterations or repairs will be allowed. The teams will gather for lunch provided by JCC.

Testing: A random testing order will be chosen, and testing will begin by placing the bridge on a fixture that has an open span of nineteen and a half (19.5") inches. No part of the bridge may touch the ground (excluding top of the abutments). A loading device will be attached to the pencil running through the bridge. The loading will be witnessed by at least one (1) judge, one (1) coach from the team, and one (1) committee member. The testing of each bridge will be performed by the team until the bridge collapses or requires outside support (ie, leans against the loading structure where it should not). Failure of the bridge may include an abnormal deflection of the bridge that, in the opinion of the judges, renders it nonfunctional and/or removes it from the supports on which it is resting. The competition will be conducted in one (1) round; and the top three High School winners and top Middle School team announced.

Prizes: Teams will be ranked by a Load-to-Weight ratio (load carried before failure divided by the weight of the bridge). The lightest bridge that carries the most weight will be the winner of the competition. Team prizes will be awarded as follows:

| | |
|--------------------|---|
| FIRST PLACE TEAM: | 1 st Place Trophy and \$100 cash |
| SECOND PLACE TEAM: | 2 nd Place Trophy and \$ 50 cash |
| THIRD PLACE TEAM: | 3 rd Place Trophy and \$ 25 cash |
| BEST POSTER: | Trophy |

| | |
|-----------------------------------|--|
| FIRST PLACE TEAM (Middle School): | 1 st Place Trophy and \$25 cash |
|-----------------------------------|--|

JUDGES' DECISIONS SHALL BE FINAL ON ALL MATTERS

Additional rules and/or clarifications will be provided as required.

For further information and/or clarifications check with your school sponsor or e-mail
Genn Miller (gmiller@sunyjefferson.edu)