
Rockland District 2021 Bridge Crush

Overview:

Cubs Scout will construct bridges using popsicle sticks and white glue. The bridges will be tested against a load-bearing machine or free weights.

Warning: All bridges will be destroyed in this competition.

** Special thanks to Pack 36 Pearl River and Pack 79 New City for providing contest guidelines, building instructions and demolishing equipment.

Contact Info:

For more information, contact Dave Damo (914-584-0389 cell / text), or damo2000@optonline.net

Submission Details:

There is no fee to submit a bridge. Each bridge must have a "Bridge Crush Submission Form" to identify its architect.

Entrants must drop their bridges off at the following place & time:

Submission Date/Time: **Sunday, April 18th, 12PM to 6PM**

Submission Place: **Camp Bullowa** (15 Franck Road, Stony Point), **Dingman Hall**

Entrants will receive an entry number, which will be written on their bridge for tracking purposes.

If you are not able to submit your bridge during this time, alternate locations might be possible. Contact Dave Damo (info above) for details.

Contest:

The Bridges will be crushed on or after **Sunday, May 2nd**.

The event will be recorded and posted to the Council Web site for viewing.

Three awards are offered per each of the six ranks: Lions, Tigers, Wolves, Bears, Webelos I, and Webelos II. The top three winners will be the top three bridges which can withstand the most weight.

Supplies:

Only two supplies are permitted:

- **A maximum of 100 popsicle sticks.**
- **Elmer's White Glue** (use as much as you need.)

Bridges must not use any other materials. Painted bridges are not permitted; all construction must be visible to the judges for review.

Construction Dimensions:

1. Materials.
 - A maximum of 100 popsicle sticks.
 - Elmer's White Glue is the only glue permitted.
2. Bridges must not be painted; all construction elements must be visible to the judges.
3. Length: minimum 18", no maximum. The bridge must be able to span two ledges that are 16" apart. An overlap of at least 1" at each support location is recommended.
4. Height: minimum 3", maximum 12". The bridge height cannot exceed 12".
5. Width: minimum 4", maximum 6". A test load will be applied to the surface of the bridge deck in the center of the span. The test pad is a 3" diameter round disk. An opening of at least 3" must exist above the center of the bridge for insertion of the test plunger from above. So, minimum width is 4" to allow the testing disk.
6. Creativity of design is encouraged!

Strength Test Procedure:

1. Bridges will be placed on one of two test devices. One is a pneumatic crusher, the other manual crusher with wrought iron weights. Lions, Tigers, Wolves will use one device; Bears, and Webelos I and II will use the other.
2. The load plunger will be positioned at the center of the bridge deck.
3. Weights will be loaded on to the plunger until the bridge fails. In most cases, failure of a bridge will be painfully obvious, otherwise, the Pack Leader will be the sole judge of failure occurring.

Construction Suggestions:

- Don't wait until the day before the completion to construct your bridge. Allow for at least 24 hours of drying time for maximum strength.
- Use all of your sticks to maximize strength.
- When finished, use leftover glue to strengthen joints and/or reinforce imperfect sticks.
- Look at some real bridges to get ideas about how to build a strong bridge.
- Popsicle sticks are very weak if you bend them, but very strong if you try to stretch them or compress (squeeze) them. Using triangles causes the forces on the sticks to be compression and tension rather than bending. In other words, triangles are strong.

Instructions for a Through-Truss Bridge

These instructions describe how to construct a through-truss bridge. This is just one example of common bridge construction. You can modify this design, or build any design of your choosing as long as it satisfies the rules.

This bridge requires 2 or 3 building sessions separated by a short drying period.

Working with glued assemblies will weaken the joints, so it's best to allow the assemblies to dry for a few hours before disturbing them.

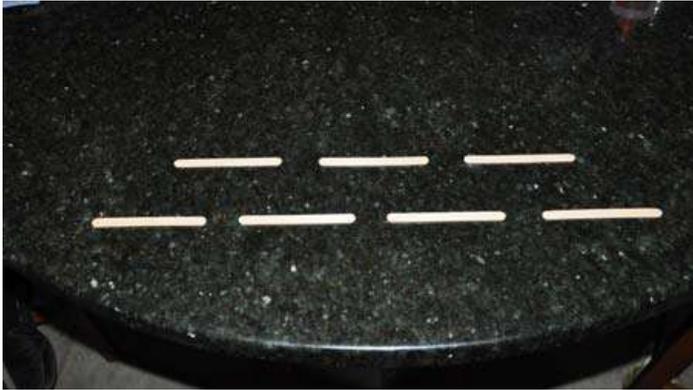
Construction of the bridge in the sample took 3 work periods of 1 hour or less.

As you will see in the pictures, use of clothes pins or spring clips to hold glued joints together is very helpful, and it will allow more pieces to be assembled between drying periods.

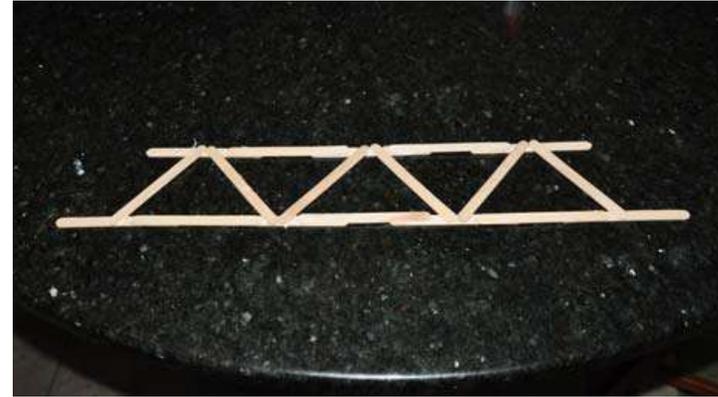
Step 1: Truss Panels

A. Place wax paper over your work surface.

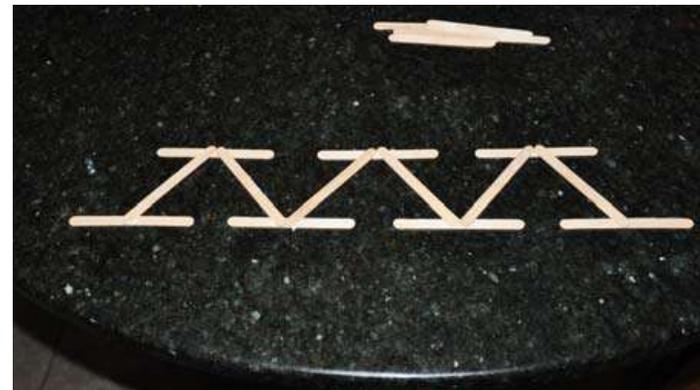
B. Place the top 3 and bottom 4 chord sticks in position. Remember to make the panel 18" long.



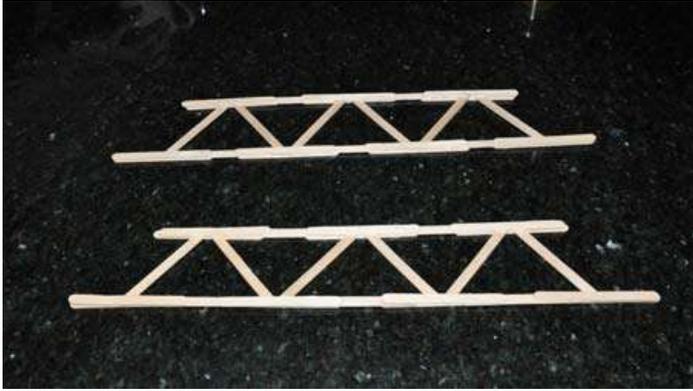
C. Glue the 6 diagonal members to the top and bottom chords. You may need to slide the top and bottom sticks left side to side a little to make it all fit



D. Glue 5 more horizontal truss chords, overlapping the members from step 2.



E. Repeat Steps 1B to 1D to make a second panel. Try to make them as close to the same size and shape as you can.



F. Place some wood or other flat material on the truss panels and weight them down. This will keep the joints tight with the glue dries. Let the glue dry for 2 hours.



Step 2: Joining the Truss Panels

2A. Stand both truss panel up on a flat surface about 4" apart. (Hint: I used two jars of tomato sauce as spacers, and big rubber bands to secure the trusses). Remember, you need at least 3" of space between the truss panels to accommodate the plunger.



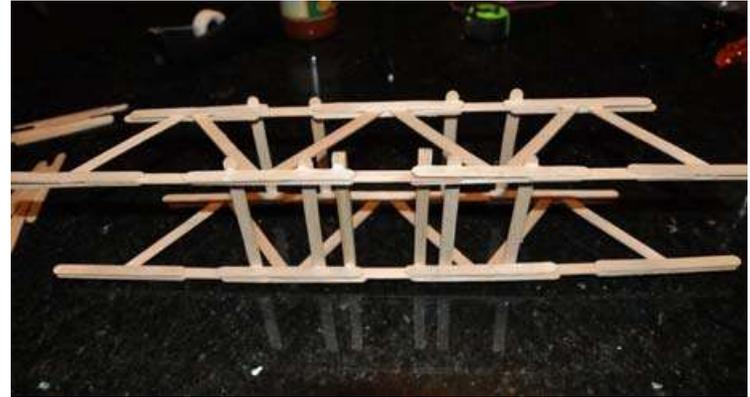
2B. Create 2 strong beams to form a landing area for the load plunger. Use 3 or 4 sticks and glue them together.



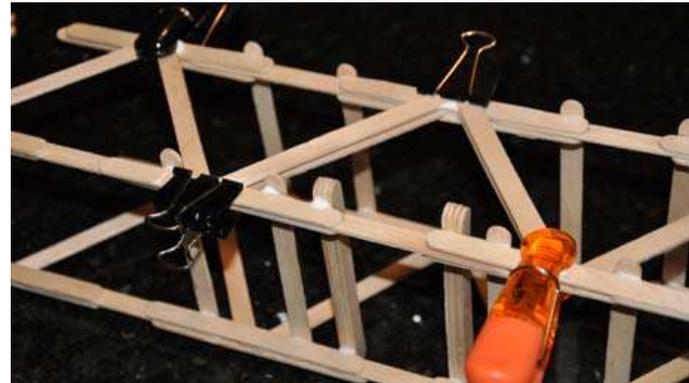
2C. Glue the beams centered at mid-span. The 3" diameter load plunger will bear on them, so make sure that they are about 2" to 2½" apart.



2D. Glue more members in place to hold the truss panels together. Place members at both the top and bottom. Remember to leave at least a 3" hole in the top to accommodate the load plunger.



2E. Begin adding reinforcing sticks to your bridge. Try to glue sticks to the truss panels so that every member is at least two sticks thick. Spring clips come in handy for this step.



2F. Let the glue dry completely for 24 hours.