



ENGINEERS &
GEOSCIENTISTS
BRITISH COLUMBIA



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NATIONAL ENGINEERING AND GEOSCIENCE MONTH

ENGINEERS AND GEOSCIENTISTS BC RICHMOND / DELTA
BRANCH AND RICHMOND PUBLIC LIBRARY

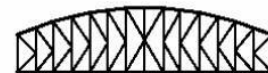
POPSICLE STICK BRIDGE CONTEST



Pratt



Parker



K-Truss



Howe



Camelback



Warren



Fink



Double Intersection Pratt



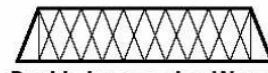
Warren (with Verticals)



Bowstring



Baltimore



Double Intersection Warren



Waddell "A" Truss



Pennsylvania



Lattice

TESTING DAY: FRIDAY, APRIL 23, 202

PLEASE READ ALL INSTRUCTIONS CAREFULLY!

THERE IS NO PUBLIC EVENT THIS YEAR

COVID-19 SAFETY GUIDELINES

In accordance with World Health Organization (WHO) and BC Center for Disease Control (BCCDC) guidelines, we urge everyone to take the utmost precautions and use personal protective equipment (PPE) when working with each other and in groups.

Due to the COVID-19 pandemic, National Engineering and Geoscience Month (NEGM) 2021 events will look different this year. While we still want to bring the excitement of NEGM events—such as the Popsicle Stick Bridge Building Contest, we want to ensure that students, parents, and educators are kept safe. To do this event safely, there will not be a public event. The testing will be recorded, and the video will be posted online later.

All participants are required to purchase their own supplies and drop off their constructed bridge by Apr 16, 2021. The drop off period is from Apr 12, 2021 and Apr 16, 2021.

Bridge Drop Off	April 12 to April 16, 2021
Drop Off Location	Richmond Public Library (Brighthouse)

AWARDS

- Awards will be electronic Amazon Gift Cards, with values corresponding to the winner's ranking.
- Awards will be emailed to the winners after testing of all bridges.
- The **top 5 Teams** will be given awards in ascending order of their scores.

DESIGN BRIEF

The goal of the contest is to construct the strongest bridge possible with only **100 Popsicle sticks and Aleene's Tacky Glue or Elmer's School Glue**. The bridge must span a 400 mm gap with a maximum height of 200 mm, and a matchbox car must be able to traverse the bridge on a construction paper deck. The design and construction of the bridge is left up to the competitor. Specifications are included below.

Participants must send in their registration form by email to outreach.rd@volunteer.egbc.ca.

Due to the pandemic, we will no longer distribute popsicle sticks and glue kits. It is up to the competitor to purchase their own supply of **100 standard popsicle sticks and Aleene's Tacky Glue or Elmer's School Glue**.

Contestants may participate as individuals or as teams. If you are working in teams, please take the necessary precautions and follow provincial public health advisories.

OFFICIAL CONTEST RULES

REGISTRATION

1. Each bridge built is considered as one (1) entry. All entries must be registered in advance. A completed registration form should be emailed back to outreach.rd@volunteer.egbc.ca by **April 16th, 2021**. Type your name(s) (**no handwriting please**) using the spelling that you want to appear on certificate for entries.
2. You will also have to write your registration information on a small piece of paper (not the registration form) and tape it to your bridge.
3. The email on the registration form will be used for sending the electronic Amazon Gift Card.
4. You will receive a confirmation email.
5. Your supplies should consist of 100 popsicle sticks, and a bottle of glue. Participants must buy their own material from craft stores or dollar stores. **Standard wooden popsicle sticks 113 mm long and 10 mm wide** must be used. No other type of glues is accepted except **Aleene's Tacky Glue** or **Elmer's School Glue**
6. It is very important that you use one of these types of glues.



7. Participants need to drop off their constructed bridge at least one (1) week before the event (latest drop off date will be Apr 16, 2021) at the following designated locations:

Richmond Public Library, Brighthouse Branch

100-7700 Minoru Gate, Richmond, BC V6Y 1 R9

Bridge Drop Off	April 12 to April 16, 2021
Drop Off Location	Richmond Public Library (Brighthouse)

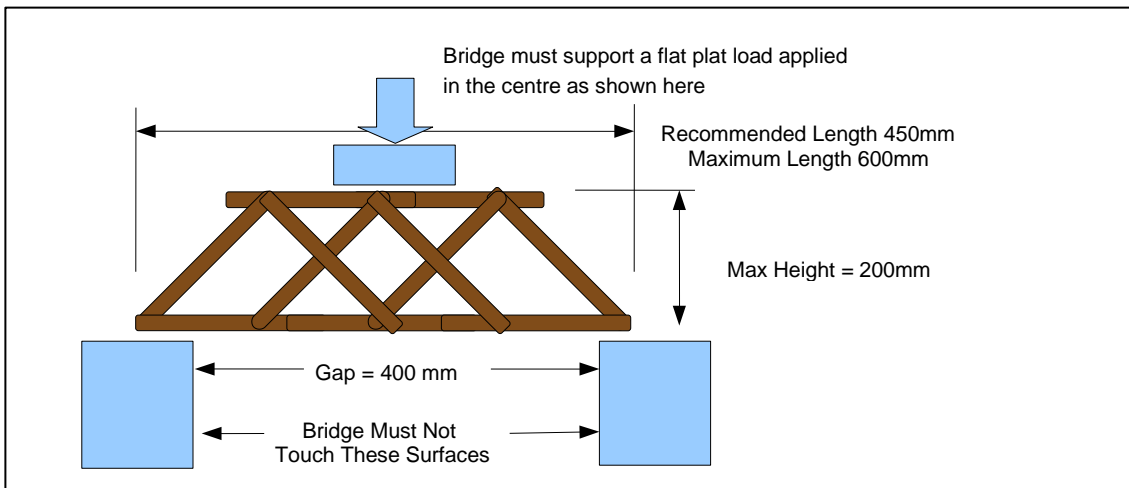
Please note: To prevent the spread of COVID-19 virus, please apply disinfectant spray or wipes to your bridge before dropping off. You must wear PPE (masks and gloves) when dropping off your bridge.

CONSTRUCTION

1. The bridge must be built with a maximum of **100 popsicle sticks** and **Aleene's Tacky Glue** or **Elmer's School Glue**. No other glues are acceptable. Popsicle sticks with non-standard dimensions are not allowed. Popsicle sticks must be used whole and without alteration. **No cutting, grinding, or sanding is permitted.**
2. A deck made from construction paper must be included, wide enough to permit a matchbox car, 35 mm wide by 15 mm high to roll across the bridge.
3. It is critical that the bridge **must span a minimum 400 mm gap**. We recommend that the bridge is **at least 450 mm long** (25mm excess on each end) to ensure that bridge does not fall through the 400mm opening when the load is applied (please see the diagram below). **The bridge must not exceed 125 mm in width.** Note that the bridge may not load the sides of the 400 mm gap at any time during the testing. If it does, the test will be terminated.
4. The test machine will apply a load to the center of the top side of the bridge as shown. The highest centre portion of the bridge should be designed to support a flat loading plate. The dimension of the loading plate is 100 mm by 120 mm. The **bridge must not exceed 200 mm in height and 550 mm in length.**
5. **Write your registration information on a small piece of paper and tape it to your bridge. Also include any specific instructions on how to test your bridge (if it is not obvious).**

TEST PROCEDURE

1. Bridges will be inspected at registration. Any violations of the rules outlined above will result in disqualification from the contest. The judging panel decisions are final.
2. Bridges will be weighed pretest at registration. In event of a tie, lightest bridge wins.
3. The winning bridge is the bridge that holds the highest load at failure. All bridges will be destroyed during testing.



BRIDGE BUILDING ADVICE

- Give yourself plenty of time; don't wait until the last minute to build your bridge. The glue will need at least 24 hours to dry and will get stronger if allowed to dry for 2 days or more. Also, wood joints are always stronger if you clamp them tight while the glue dries, try using big binder clips to clamp the sticks together (clamps will be removed before testing).
- For bridge ideas look around at real bridges. A Popsicle stick bridge is of course much smaller, but the same principles apply (the important part is not the deck, but the steel or concrete structure that supports it). Look particularly at railway truss bridges, but also at bridges like the Port Mann Bridge, the Second Narrows Bridge, and the Queensborough Bridge. The Lions Gate Bridge and Alex Fraser Bridge are not good examples to follow because they are suspension bridges and rely on cables.
- Research the internet and your local library for excellent bridge reference information to help your design.
- Your bridge needs to have a solid, stiff shape. Notice how a popsicle stick is much stiffer and stronger when on its edge. A bunch of sticks glued together flat, like a raft, has very little strength and will sag during testing. Also, the strongest structural shape is a triangle.
- A bridge that is symmetrical is less likely to twist when loaded and hence will probably carry more loads.
- If you aren't sure if your bridge will be stable, test it yourself, span it across two tables at 400 mm apart, and press down on the top of the bridge in the middle of the span. Just be careful not to break your untested creation!
- In past years, winning bridges have held over 300 kg (660 pounds). The highest record for a bridge with only 75 sticks was 322 kg (710 pounds) and with 100 sticks was 547 kg (1206 pounds)!