



ENGINEERS &
GEOSCIENTISTS
BRITISH COLUMBIA

POPSICLE STICK BRIDGE BUILDING COMPETITION

VICTORIA BRANCH

April 23, 2022
12:00 PM – 4:00 PM
Virtual Event

The Victoria Branch is proud to host the Popsicle Stick Bridge Building Competition in celebration of National Engineering and Geoscience Month.

To find out more or to register, email
outreach.vic@volunteer.egbc.ca or

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1 CATAGORIES

Anyone is welcome to participate!

Contestants may participate as individuals or as teams.

CATEGORY	ENTRY SPECIFICATIONS
Grade 8 and under	Single student build bridge or team-built bridge*
Grade 9 and 10	Single student build bridge or team-built bridge*
Grade 11 and 12	Single student build bridge or team-built bridge*
Mix Teams	Mixed grade category team entry, individual adult entry or mixed student adult team entry
Corporate Team	Must be a minimum of 2 team members representing a corporation

* Bridges build by a team are considered as one (1) entry. All team members must be in the same category, no more than four members in a team.

2 SCHEDULE

Video of bridge testing will be emailed to registered teams along with the winners of each category.

3 AWARDS

- Gift card prizes will be announced to registered contestants.

4 REGISTRATION

1. Each bridge built by a team is considered as one (1) entry. All entries must be registered in advance. A completed registration form should be emailed to chair.vic@volunteer.egbc.ca by **March 31th, 2020**. Type your name(s) (**no handwriting please**) using the spelling that you want to appear on certificate for entries.
2. A limited number of construction kits will be available for pick-up from between February 1st - March 15th. Pick up location can be found on registration form. Email instructions are on the registration form. You will receive a confirmation email.
3. The materials kit consists of 150 popsicle sticks, and a bottle of glue. Participants can also buy their own material from craft stores or dollar stores. **Standard wooden popsicle sticks 11.3 cm long and 1 cm wide** must be used. No other type of glues is accepted except **white school glue such as Titan School Glue or Elmer's School Glue**. *Hint: Allow a minimum of 24 hours drying time!*

5 BRIDGE DIMENSIONS AND RULES

First Rule is to have fun building your bridge!

Construction

1. The bridge must be constructed by the registered participants. Failure to follow this construction rule will result in disqualification from the prizes.

Dimensions

1. The bridge is required to **span a 500 mm gap** and should be long enough to have a bearing area on both ends beyond 500 mm (i.e. **50 mm excess on either end for a total length of 600 mm**). **The bridges cannot be longer than 600mm or they will not fit into the 'Crusher'**. See building envelope in Figure 2. for clarification.
2. The bridge must be a **minimum 100mm wide (but less than 200mm)**.
3. Bridge should be **less than 200mm high**.
4. Bridge must protrude **no more than 50mm below the bottom of the bridge deck**.
5. Bridge must be free from support by **30mm on each side**.
6. Bridges have a maximum allowable vertical deflection of 5cm – if there is more than this the bridge may not be testable.
7. Bridges will be inspected during registration. Any violations of the rules above will result in disqualification from the prizes; entrants will still be able to test the bridge as per the discretion of the event organizers.

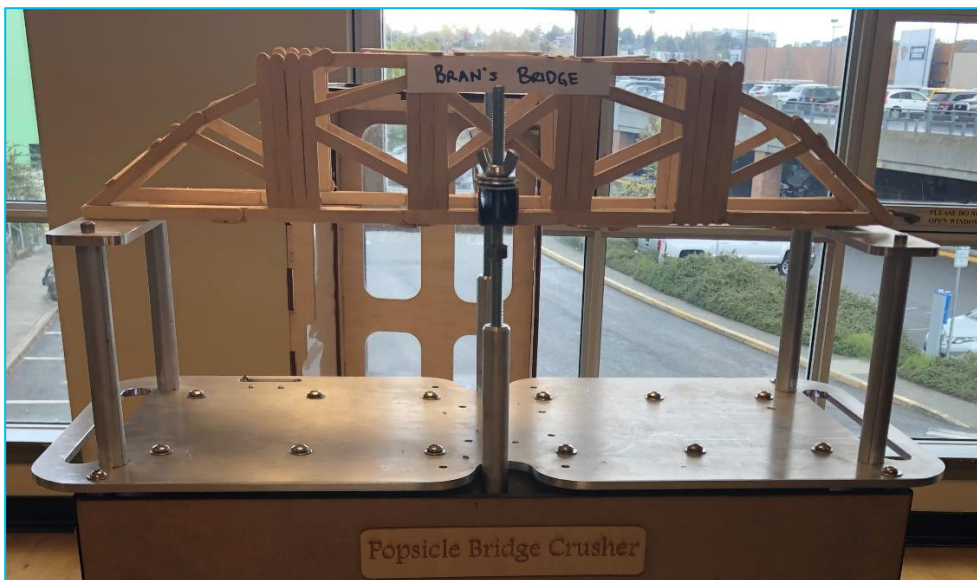


Figure 2 - From 2019 EGBC Victoria Popsicle Stick Bridge Building Competition

Materials and Components

1. Bridges must be built using a maximum of 150 standard popsicle sticks and standard all-purpose white glue. No other glues are acceptable (including carpenter's glue). The material for the bridge construction will be provided,
 1. One(1) pack of 150 popsicle sticks
 2. One(1) 4oz bottle of white glue.

Registrants will have an opportunity to pick up popsicle stick kits between February 1st through March 31th. Locations to be confirmed in registration confirmation.

2. If entrants choose to use their own popsicle sticks, they must be within the following specifications:

- 1) 113mm Long.
- 2) 10mm Wide.
- 3) 1.5mm Thick.

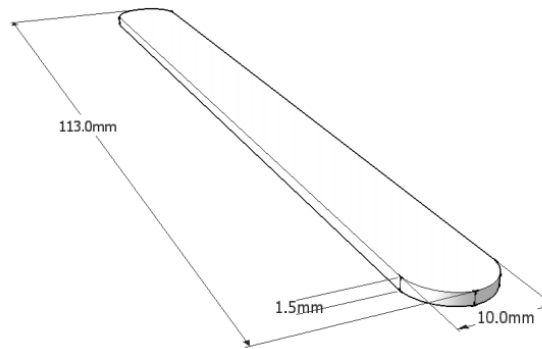


Figure 3 - From EGBC Northern Branch Popsicle Stick Bridge Building Competition

Aesthetics

1. The full name of the school (if applicable), grade (if applicable) and team name must appear on the bridge, on a banner attached to the bridge. The letters are to be a minimum of 10mm high. It should be in place on the bridge before registration.

Rules

1. The bridge must conform to **A. Construction, B. Dimensions, and C. Materials and Components.**
2. The complete bridge is to contain a maximum of **150 Popsicle sticks** joined together with all purpose, nontoxic glue (**note: crazy and industrial glue are not permitted**). White glue is the only glue permitted.
3. Popsicle sticks may be cut.
4. Pinning, clamping or non-white glue are not allowed to be used for connections. Failure to abide by this rule will result in disqualification.
5. The banner must be clearly visible. For more information on the label, see Aesthetics.
6. The bridge must have clearance to insert the loading bar. Sizes can be found in Bridge Testing

6 BRIDGE TESTING

1. Drop your bridge off at the designated bridge drop off location found in the registration form.
2. Bridges will be weighed upon registration on the day of the event to ensure that a maximum of 150 popsicle sticks are used.
3. The bridges will be loaded from the bottom, the loading bar will be placed roughly over the center of the bridge. Sufficient space must be provided for the loading mechanism, a **30mm x 30mm** gap must be provided between the vertical members of the bridge at the center (see figure 4. below). The gap is to be continuous throughout the width of the bridge and must allow the bar to sit directly on the bridge deck.

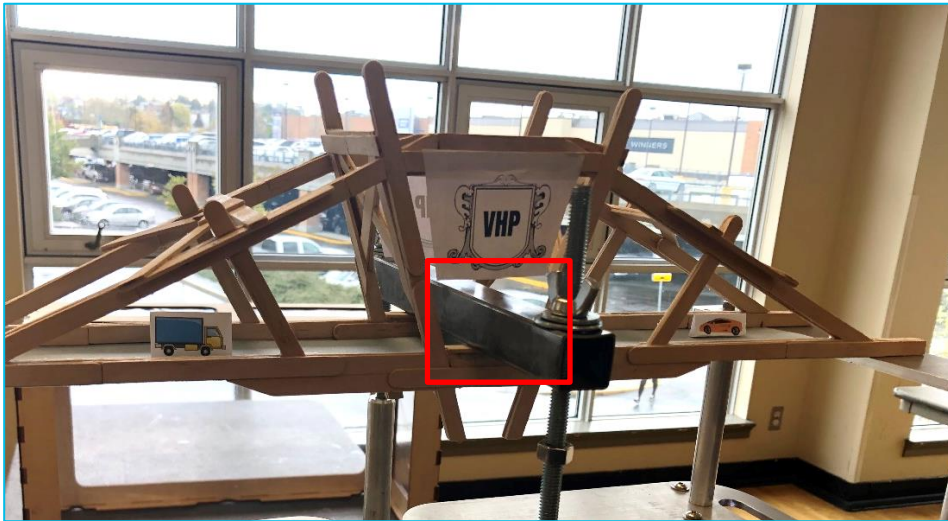


Figure 4 - Photo from 2019 competition.

4. All contestants and officials within the loading area must wear protective eyewear (provided).

Note: Testing will result in most or all bridges being destroyed, so take your pictures before!

Judging Criteria:

1. Evaluation will be 50% strength, and 50% on construction aesthetics.
2. Bridges will be judged separately on the basis of aesthetics and the ratio of load carrying capacity to the bridge mass.
3. Judges will examine each bridge to ensure that only popsicle sticks, white glue and construction paper are used and that the construction paper is only used for the bridge deck.
4. The full name of the school and team name of each team must appear on their bridge, on a banner attached to the bridge. For more information on the label, see [Aesthetics](#).
5. EGBC's Bridge Testers will record the maximum load that each bridge carries prior to failure.
6. The recorded load will be divided by the bridge's mass to determine the load/mass ratio.

7. The highest load/mass ratio will determine the winners. In the event of a tie (same load/mass ratio) the lighter bridge will win.

7 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 paper clips to clamp the sticks together (clamps must be removed before competition).
- 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 Johnson Street Bridge, Bay Street Bridge, and in Vancouver the Port Mann Bridge and the Second Narrows Bridge. The Lions Gate Bridge and Alex Fraser Bridge are not good examples to follow because they rely on cables.
- Research the Internet and your local library for 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. The strongest structural shape is the triangle.
- A bridge that is symmetrical is less likely to twist when loaded and hence will probably carry more load.
- If you aren't sure if your bridge will be stable, test it yourself - span it across two tables set about 500 mm apart, and press down on the top of the bridge in the middle of the span.
- The winning bridge at this competition in 2019 held 207.1 kg (456.6 pounds). The record for a bridge with only 150 sticks is 321.9 kg (710 pounds)!

REGISTRATON FORM

VICTORIA BRANCH POPSICLE STICK BRIDGE BUILDING COMPETITION

Event Date: April 23, 2022
Event Time: 12:00 – 4:00pm
Location: Virtual Event

1. Register as an individual or a team by completing the form below.

Team Name: _____

Team Members/ Bridge Builders:	School and Grade or Company Name

2. For grade school students: please provide a name and email address of the adult team leader who will be responsible for coordinating your team.

For university students, professionals or other adults entering the open or corporate team category: please provide your own name or team leader's name and an email address.

Name: _____ **Email:** _____

(This will allow us to contact you with further information regarding the competition, if required.)

3. There are two steps to registration:
 - a. Save the completed form and return by email to outreach.vic@volunteer.egbc.ca by March 31, 2022.
 - b. Register your team name and pay the entry fee at:
4. A limited number of construction kits will be available in for pick-up from February 1st to March 31. If you are interested in picking up a kit please email outreach.vic@volunteer.egbc.ca for more information.

4. Entry cost are as follows:

CATEGORY	ENTRY SPECIFICATIONS	ENTRY COST
Grade 8 and under	Single student built bridge or team-built bridge*	\$10
Grade 9 and 10	Single student built bridge or team-built bridge*	
Grade 11 and 12	Single student built bridge or team-built bridge*	
Mix Teams	Individual adult entry or mixed student adult team entry	\$15
Corporate Team	Must be a minimum of 2 team members representing a corporation	\$30

Entry fees can be paid through the EGBC registration link:

* students should register for the category of the oldest student. Junior students are welcome to join more senior teams.

5. Refer to the Contest Rules and Guidelines for information regarding the construction and testing parameters for your bridge. The rules and guidelines are available on the EGBC website:

6. Email any questions to outreach.vic@volunteer.egbc.ca

7. Build your bridge

8. Have fun!