



Bridge Building Contest

Rules and Checklist

Bridge Classes 3–5, 6–7, 9–12, Open

Objective: The objective of the competition is to construct the lightest bridge that will span a gap of 700 mm while supporting the heaviest weight.

Please check this list carefully because the judges will also be checking your bridge using the same list. **The answer to each question must be “Yes.” If not, your bridge will be disqualified.** If your bridge is disqualified, it will still be tested but will not be considered for any prize.

What to check. These are essential! Otherwise, your bridge will be disqualified. If you are entering the ALL-CAN category, this is the WRONG checklist; you need the other one.	Yes?
1. Is your bridge constructed only of the standard wooden stir sticks, glue, and dental floss? <ul style="list-style-type: none"> • No limit on number of sticks, or amount of glue or dental floss, but remember: the heavier your bridge, the lower its score. • Glue can be any kind. Painting is not recommended. • Standard wooden sticks are available for pickup from the Department of Education reception (667-5141) in Whitehorse or from Engineers Yukon http://engineersyukon.ca/contact-us.php for the Communities. • If you are not sure you are using the right sticks, check http://engineersyukon.ca/yukon-bridge-building-contest.php. 	
2. Is your bridge constructed without using power tools? <ul style="list-style-type: none"> • You may not drill holes in the sticks using a power drill. • You may cut sticks or snip off the ends using clippers, heavy wire cutters, or a hand saw. 	
3. Is the overall length of your bridge at least 800 mm but no more than 1000 mm?	
4. Is the overall height of your bridge less than 300 mm top to bottom, measured from the highest point above the deck (roadway) to the lowest point below the deck?	
5. If your bridge hangs down below the level of the deck, does it hang down less than 150 mm, measured from the top of the deck?	
6. Is the deck of your bridge at least 130 mm wide and 800 mm long? <ul style="list-style-type: none"> • Check very carefully that the ends of the bridge will sit flat on the filing cabinets. • Filing cabinets are exactly 700 mm apart; the deck must be at least 100 mm longer than that but no more than 1000 mm. • Check the width of the bridge measured on the deck planks. The planks must be at least 130 mm across. It's OK to have some parts of the bridge slightly wider than the planks. 	
7. Does the bridge have sufficient clearance for a vehicle 50 mm wide and 70 mm high to travel the complete length of the deck? <ul style="list-style-type: none"> • Pay special attention to any overhead supports that might obstruct the vehicle's passage. • Make sure you check both ends and the complete length of the deck for clearance. • Note that for testing, a block <i>approximately</i> 75 by 100 mm will be placed in the centre of the deck at the middle point of the bridge (see the testing diagram) and weight will be applied in the middle of that block. Your bridge must have clearance for that block and the deck must permit the block to lie flat, i.e., your deck cannot have any bumps in the middle. 	
8. Will the bridge sit vertically (flat) and freely on the filing cabinets with no other structural support? <ul style="list-style-type: none"> • The bridge structure below the deck must not touch the sides of the filing cabinet. • Anchoring the bridge with tape or staples is not permitted. 	
9. Is the deck level with the filing cabinets? <ul style="list-style-type: none"> • Your bridge should permit a scale-model vehicle to drive on or off the roadway from the filing cabinet at each end. • A small bump the thickness of a stick or two is OK. 	

Note: There are more things to check on the next page!

Here are other things to check. **The answer to all these questions should be “Yes”** to ensure that your bridge is tested fairly, but you won’t be disqualified if the answer is “No.”

What to check	Yes?
<p>10. Is the deck made of sticks with no gaps between them?</p> <ul style="list-style-type: none"> ● There cannot be holes or spaces in the roadway. ● The roadway should be smooth with no protruding sticks that would make for a bumpy ride. ● If any gaps in the deck are found, the weight of the sticks required to fill the gaps will be added to the bridge weight. 	
<p>11. Is the top of the bridge labeled with the word “TOP” using a felt marker?</p> <ul style="list-style-type: none"> ● The top of the bridge is not always obvious to the tester. ● If this is not marked, your bridge may get tested upside down. 	
<p>12. If your bridge was not built 100% at school, is it entered in the Open category?</p> <ul style="list-style-type: none"> ● Your bridge cannot be entered in the school grade categories if it was not built at school. ● If you take your bridge home to work on it, you must enter it in the Open category, not any of the school categories. 	
<p>13. Is the bottom of the bridge labeled with the builder(s) name(s), school name, and category using a felt marker?</p> <ul style="list-style-type: none"> ● This will ensure <i>you</i> get credit for <i>your</i> bridge. ● This will also ensure that you receive an official photo of your unbroken bridge. 	
<p>14. Is your bridge accompanied by a completed narrative form?</p> <ul style="list-style-type: none"> ● There should be a separate narrative form for each bridge. Make sure you use the correct narrative form (not the ALL-CAN one). ● A good narrative can increase your score by 10%. ● Narrative forms are available on the Engineers Yukon website or contact tim@timmit.ca. 	

Bridge Testing

All bridges entered in the contest are tested to the point of failure using the test setup shown in the diagram.

A 19-mm-high wooden block approximately 75 by 100 mm is placed in the centre of the deck at the centre point of the bridge. Weight is applied progressively to that block using a dowel, yoke, and weights in a bucket. The block helps distribute the weight somewhat so that it’s not concentrated at a single point on the bridge. The initial weight applied to each bridge is approximately 2 kg. The bridge is considered to have failed as soon as the vertical deflection (bend in the middle) exceeds 50 mm.

The weight of the bridge (measured before the competition) and the load (including the weight of the block, dowel, yoke, bucket, and weights in the bucket) that caused the bridge to fail are used in calculating the strength factor:

$$\text{strength_factor} = \text{load} / (\text{bridge_weight})^2$$

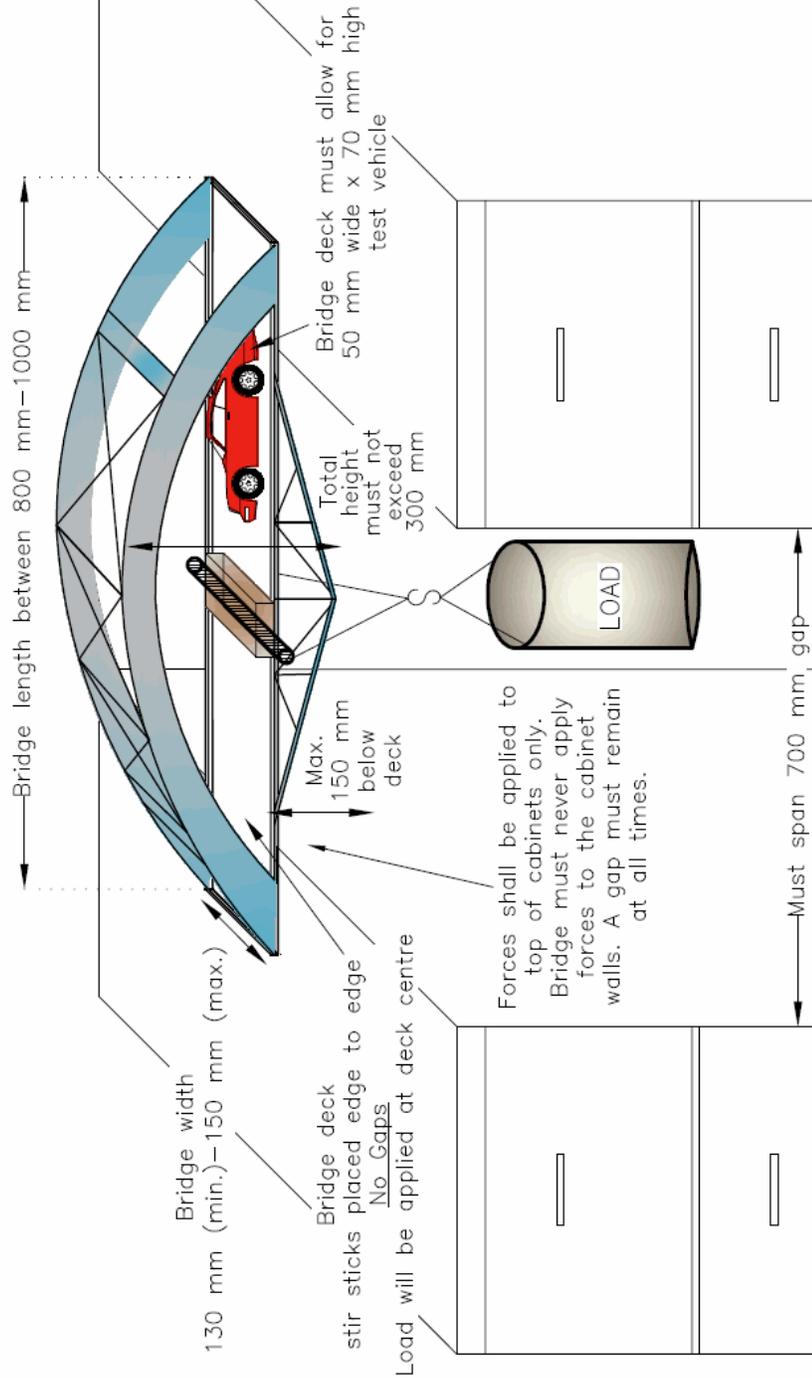
HINT: According to the strength factor formula, the more load your bridge can support, the higher your score. But the more your bridge weighs, the lower your score. Therefore, a very strong bridge that is also very light will receive a relatively high strength factor score. You should try to make your bridge as strong as possible but also as light as possible. This is called a “trade-off.”

Each narrative will receive a mark out of 10 points (2.5 points for the answer to each question). The narrative score will be combined with the strength factor to give the overall score using this formula:

$$\text{Overall score} = \text{strength_factor} \times (1 + (\text{narrative_score}/100))$$

HINT: A good narrative is very important because it can increase your overall score by as much as 10%.

Note: For complete details refer to competition rules.



Scale 1:10



Yukon Bridge Building Competition Bridge Testing Set Up

Competition Categories

Each bridge must be entered in one of the following categories:

CATEGORY	ELIGIBLE PARTICIPANTS
Grade 3–5	Team of up to four students with the oldest student(s) in grades 3, 4, or 5; no adult assistance in the physical construction of the bridge. Bridge must be built at school.
Grade 6–7	Team of up to four students with the oldest student(s) in grades 6 or 7; no adult assistance in the physical construction of the bridge. Bridge must be built at school.
Grade 8–12	Team of up to four students with the oldest student(s) in grades 8–12; no adult assistance in the physical construction of the bridge. Bridge must be built at school.
Open	Team of up to four students in grades K–12 with minor hands-on assistance by adult(s); may be built at either/both of school/home
ALL-CAN	Any number of builders, any age, any level (may include businesses, organizations, families, teams, or individuals). Rules are slightly different (see the ALL-CAN checklist) to encourage a wider range of bridge designs. Because of this diversity in design, a representative from the builder team for each ALL-CAN bridge should attend the competition to set up the bridge so that it can be tested as designed.

NOTE: All bridges in the grades 3–5, 6–7, and 8–12 classes must be built entirely at school without any adult assistance other than verbal encouragement. Any bridge built outside of the school classroom or where an adult was involved in the physical construction must be entered in either the Open or ALL-CAN category. The judges reserve the right to place entries in the more appropriate category.

Prizes

The following prizes will be awarded:

WHO	PRIZE
Each participant	Participation prize and certificate with photo of unbroken bridge
Individual or team with highest overall score in each category	Trophy (to be retained during the year and returned before next year's competition) and bragging rights (to be retained indefinitely)
Individual or team with highest overall score in in 3–5, 6–7, 8–12, and Open categories	A plaque for each person to keep.
Individual or team with four highest overall scores in 3–5, 6–7, 8–12, and Open categories	Cash prizes in the range \$25–\$100
Participant in each category who submits the best narrative	Varies annually
Participant who enters the best-looking bridge	Varies annually