

Bridge Project Details



You will work with a group of up to three people to construct a bridge that will span a 35.0 cm gap. The bridge needs to be no longer than 45.0 cm but it must be longer than 35.0 cm or it will fall into the crevasse. The roadway must be at least 5 cm wide for traffic to cross. To the right, you see one that held 5200 g or about 11.4 lbs and had a finished mass of only 32 g (just over an ounce!)

Rules and Guidelines:

- 1) You will have 50 plastic straws in a specific color and access to hot glue. Hot glue is remarkably dense compared to the weight of a straw and the final mass of your bridge is critical. **Use as little glue as possible.** You will have access to “practice straws” as well. These may not be included in the final product but you can use them to try out a design or practice assembly.
- 2) You have a maximum weight limit of 55 g.
- 3) The maximum length of the bridge is 45.0 cm. The height should be approximately 5.0 cm. The gap, or canyon, is 35.0 cm wide. The roadbed must be a drivable/open 5.0 cm width. This means that you probably need to make it 6 cm wide to take into account the diameter of the straws.
- 4) You must begin with a diagram that shows the placement of every beam. You must hand draw your design, full size, on a large sheet of paper or centimeter grid paper taped together to make a larger sheet and then make a **second identical copy**. You must record basic measurements (length of the components) on the diagram.
- 5) You will build **on** the paper diagrams. This means that one of you is building one side while another is building the other, matching side. The third person helps and is in charge of the road bed and “roof” of the structure. You do not need to draw a full size pattern for the road bed or roof.
- 6) **Everyone is working all the time.**
- 7) You may have a substructure that extends into the canyon/crevasse, but it cannot be attached to the land mass in any way.
- 8) Failure is defined as the roadbed is no longer passable or the bridge collapses.
- 9) Testing: a) a 5 cm wide by 10 cm long thin piece of wood will be placed in the center of the bed, perpendicular to the roadway (not the top of the bridge). A piece of rope is tied to either end of the plank to form a loop. B) An empty paint can hangs from the loop into the crevasse that the bridge spans. The can is filled with sand, rocks, or masses at a relatively quick rate until failure occurs. It is permissible for the instructor to allow this process to take several minutes.



Failure to meet the following requirements means that you will lose all testing points.

- _____ Your bridge must span a 35.0 cm gap.
- _____ It cannot be longer than 45.0 cm.
- _____ The roadbed – the driving portion of it – must be a minimum of 5.0 cm wide.
- _____ You have 50 straws in your specific color. Under no circumstances should you supplement this.
- _____ There must be a space for the test plank. It must be > 6.0 cm wide and .75 cm tall.

In addition, your bridge must be:

- _____ Entirely free standing
- _____ Support at minimum, the mass of the testing materials. **Failure = loss of all test points.**
- _____ Have a finished mass of **less** than 55 grams. Each gram over will be a **5 pt deduction** to the overall score.

What You Don't Need

- A full road bed so that a vehicle could pass. We are testing the bridge, not the roadbed.
- It does not need to be pretty. It needs to be functional.
- Extra glue – your score depends, in large part, on the mass of the finished structure. More glue DOES NOT HELP.

