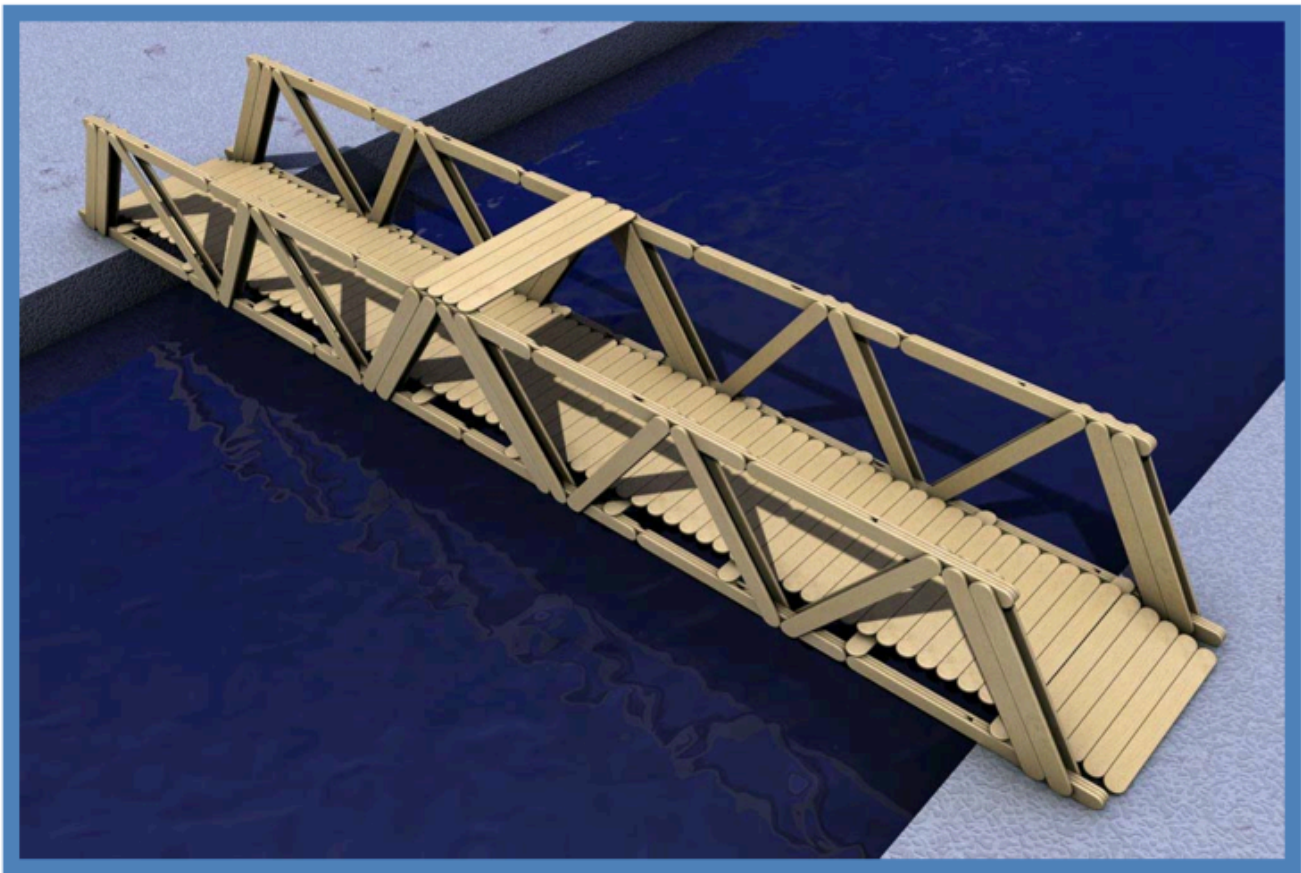


# Building Bridges Geometry final Project

## Popsicle stick Bridge



In this activity, you will create and then test a popsicle stick bridge to specifications and then your bridge will be tested. This activity can be done in groups or alone.

## Materials needed:

- \*100 Popsicle sticks per group
- \*Elmers white glue
- \*Truss blueprints

## Written requirements:

Explain the geometric attributes of your bridge: Parallel lines, perpendicular sides, sides that are horizontal, vertical and diagonal. Show any right angles and lines of symmetry.

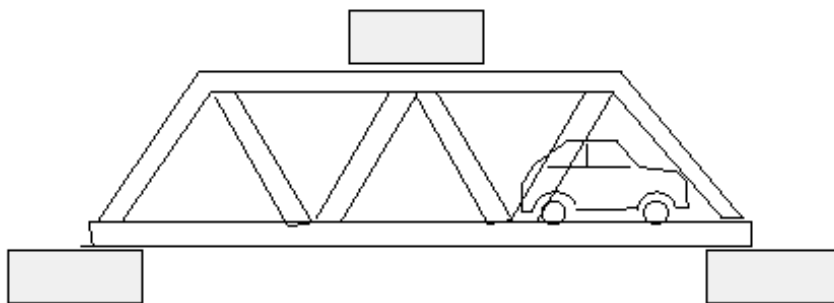
## **Building a Popsicle-Stick Bridge**

The goal: to build the strongest possible bridge to take a matchbox car, using wooden popsicle sticks.

Constraints:

- The bridge must span a 55cm gap
- No more than 100 popsicle sticks may be used
- The sticks may not be cut
- Only white glue may be used
- Construction paper may be used for the deck only
- The test load is applied to a 4cm-wide section at the top of the arch.

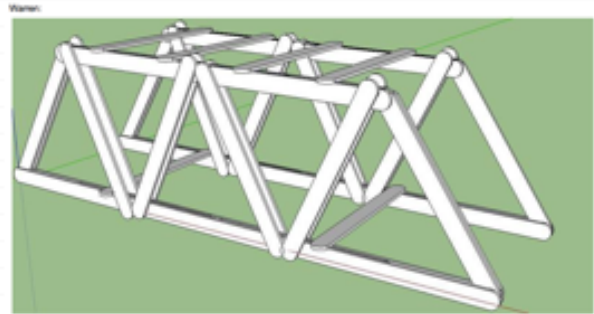
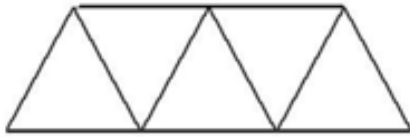
The test jig looks like this:



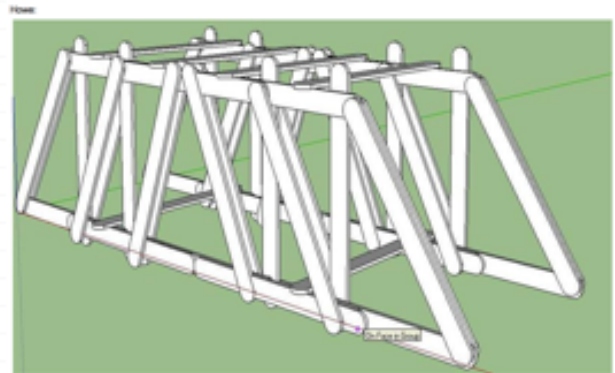
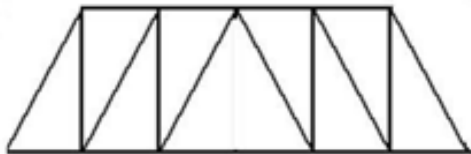
(Well-built bridges can support over 200kg - the weight of two adults)

# Truss options:

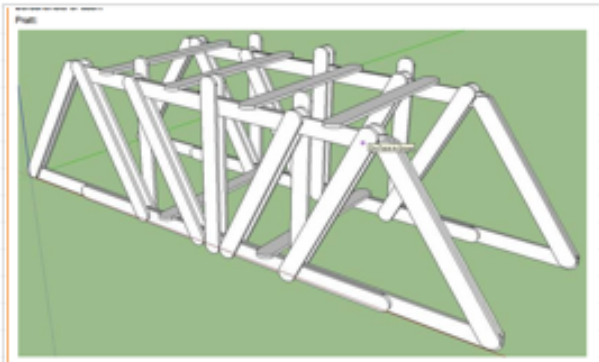
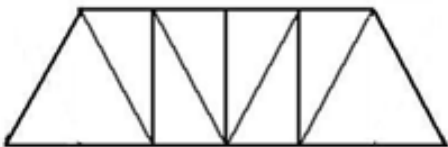
Warren



Howe



Pratt



### Step One: Brainstorming

Discuss with your group how you think the bridge should be constructed in order to support the most weight.

- 1) Write down some of your ideas, these may include insight into...
- Structurally strongest geometric shapes for the simply supported bridge
  - How you plan to construct your bridge and why
  - How you plan to deal with the limitations of the load fixture, i.e. that a 4" x 1" metal plate must be able to approach your bridge from above and apply downward force at the mid-span wherever it touches. **Hint: You want the load to distribute itself well onto significant structural members you have designed**

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### Make a Prediction:

Write down your prediction for the maximum weight your bridge will hold in the box below.

<hr/> pounds (lbs)
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## **Sketch your bridge blueprints**

Build your bridge:

Once you have decided on a design, construct your bridge. Keep in mind the rules:

Your bridge...

- A. Must be made with only the materials provided
- B. Must rest freely on supports that span 55 cm
- c. Must provide top supports to allow for weights to be placed on top to test the load.
- D. Written requirements must be completed
- E. Project must be labeled clearly and application form completed.
- F. Presentation to class...PRACTICE!

**Grading:**

Grades will be broken down into three categories: strength, workmanship, and presentation.

1. Strength [35 points]: Points are awarded to teams based on how much weight their bridge carries prior to failure.
2. Workmanship [10 points]: Points are awarded to teams based on the degree to which their bridge appears to be the professional-looking and shows a high level of craftsmanship.
3. Presentation [15 points]: Points are awarded to teams based on a presentation of their bridge to the class. Students must address the questions listed below in a creative and professional manner.

4. Written requirements (15 points): See written guidelines above

Finally... It's time to test your bridges!!!