

Steps to Building a Truss Bridge

The power of this project for young students is both in the design phase (mental image to hand drawing) and in experiencing the stresses on their structures once they are tested by loading a force on the bed of the bridge.

The best way to start is to lay out the maximum dimensions on paper (30 cm in length x 10 cm in height), and then to draw your truss. You can also simply copy a truss design from a web site listed below and print it out to scale - or a length of 25 to 30 cm and height of 50 to 100 cm. Make sure your design conforms to the contest dimensions.

- Make two paper copies of the truss design and these to measure and lay out the balsa wood.
- Make two identical trusses using balsa wood and glue and allow to dry.
- Once dry, add connecting pieces to give your bridge width and form.
- Please make sure the final design conforms to the contest dimensions and that you can pass a 5 cm square block through the final bridge along the bridge bed – the bridge should be ‘functional.’
- Adding diagonals to the bed will resist shear stress and strength your bridge.

You can do a bridge in a day. Students should be able to design the truss in a one hour period, and cut and glue the truss in another, and the final hour connect the two together.

Tell students to keep the truss simple - this is a common mistake of younger students. More elements mean more work and also more weight. We award bridge efficiency so added elements don't always translate into more strength.

Review the difference between stress and strain with our students and aspects of stress such as compression and extension:

- Stress - Force per unit area
- Strain - resulting deformation related to stress

When a truss is stressed, one side experiences tensional stress (extension) and the other side compressional stress. Materials in tension are often weaker so that is where failure occurs in the structure. We will test your student's bridges to the point of failure which we define as where the structure can no longer sustain a stress - they crack or a joint separates. We use the peak stress in our computation of bridge efficiency.

Favorite web sites for additional information regarding truss bridge design

<http://pghbridges.com/basics.htm>

<http://www.garrettsbridges.com/> (Truss Bridges in general – for advanced work.)

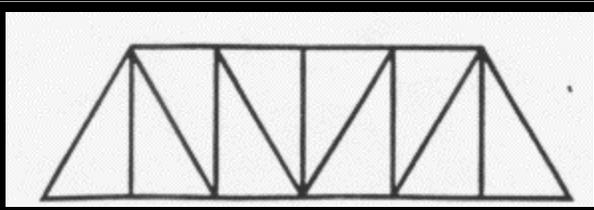
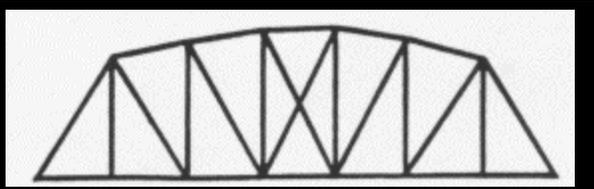
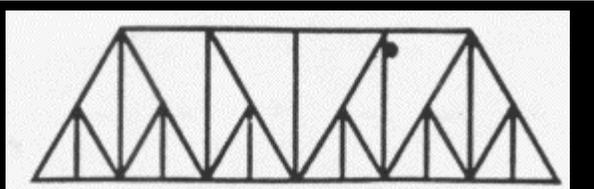
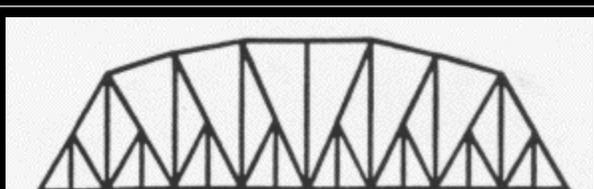
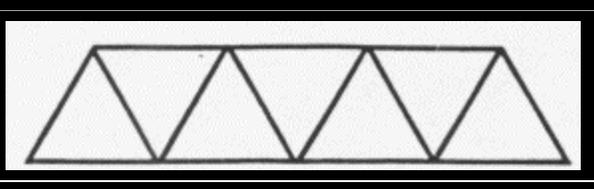
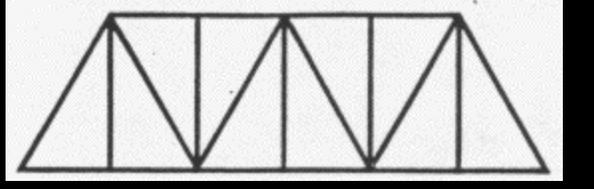
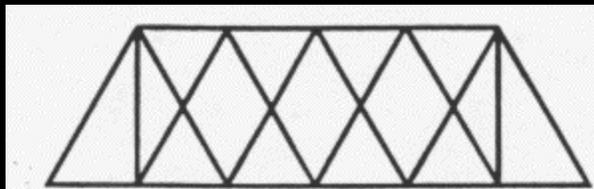
http://www.ehow.com/how_5712362_use-build-model-truss-bridge.html

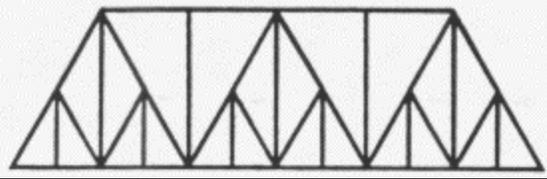
<http://www.42explore.com/bridge.htm>

<http://www.jhu.edu/virtlab/bridge/truss.htm>

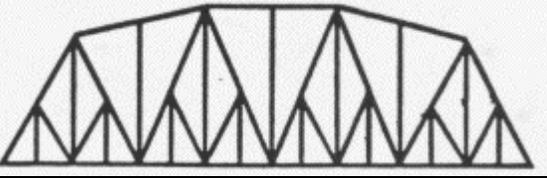
Updated 10-11-16

Bridge Truss Designs

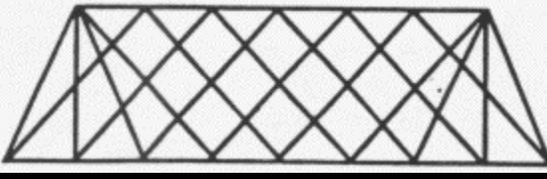
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	CURVED CHORD PRATT
	BALTIMORE
	PENNSYLVANIA(PRATT)
	WARREN W/O VERTICAL SUPPORTS
	WARREN WITH VERTICAL SUPPORTS
	QUADRANGULAR WARREN



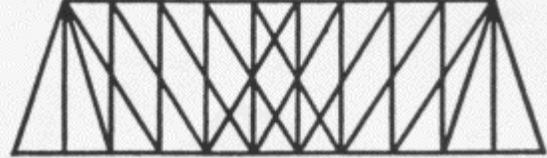
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SUBDIVIDED WARREN
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