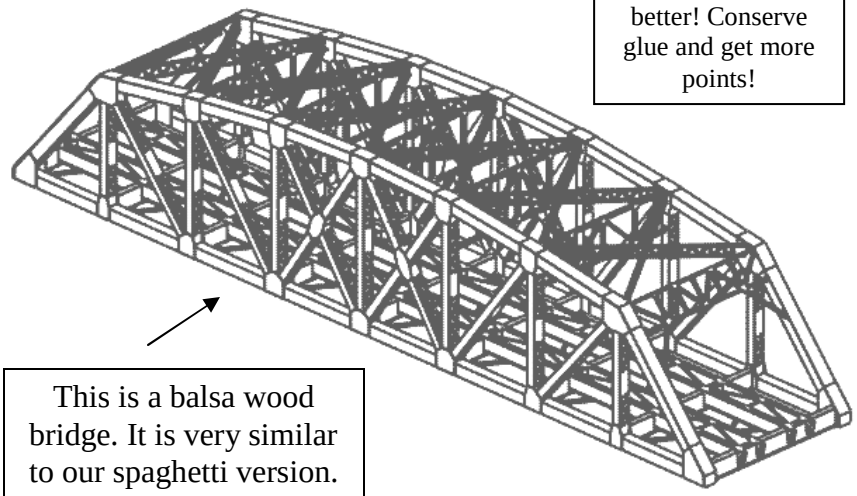
Overview:
Spaghetti Bridge Design Project

You and a partner will be building a bridge that you designed out of spaghetti! Once you have built your bridge, we will weigh it, then we will use **destructive testing** to determine your success.

In reality, we want our bridges to be very strong, but easy and inexpensive to build.
Therefore, your grade will be determined by:
-Overall weight of your completed bridge (dead load)
-Weight that your bridge holds up (live load)

The team with the ***lightest, strongest*** bridge
will receive the highest grade and a prize!!!!!

The lighter the better! Conserve glue and get more points!



This is a balsa wood bridge. It is very similar to our spaghetti version.

Things To Consider:
Your bridge will have four main parts.
- Two sides,
- a bottom (the roadway),
- and a top!

We will build these parts flat, and then assemble them into a 3D bridge- similar to the 4 walls of a house.

How To Be Successful:

Work together with your partner! There is more than enough work to be done. Many hands make light work, so let's go!

Build carefully. Each piece counts. Your bridge may hold significantly more if it is symmetrical in both design and construction.

If you have a weak side, the force of the test will crush that side first, and it will pull the good side down with it!

Safety Concerns:

Remember these few rules and you'll be fine:

- Hot Glue is HOT!
It burns you!
- No sliding on the floor (you could fall face-first into a machine or vice)
- Clean up after yourself!
- Sharp tools will help you trim your spaghetti, but they will also trim your fingers!
Be aware!

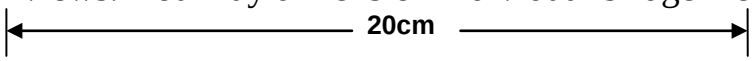
SPAGHETTI BRIDGE DESIGN PROJECT

Step 1: Choose a design/pattern for your truss bridge. You may use a successful design from West Point Bridge Design or an existing bridge.

Step 2: On graph paper, draw the side view of your truss bridge. Draw it so that it is between 20 and 30 cm long and between 3 and 8 cm high.

Step 3: On a separate sheet of graph paper, draw the top and bottom (roadway) of your bridge design. You may choose any pattern for this (XXXX or /\/\/\/\). Just remember, triangles are strong!
For "curved" trusses, ask your instructor for help.

Step 4: Once your drawings are complete, add dimensions to them. Dimensions are a system of measurements on a drawing that tell us the size of objects. Minimum required dimensions are: length and height of side, top and bottom views. You may dimension individual bridge members if you wish.



Step 5: Tape your graph paper (side view) to a piece of cardboard. Then, cover your drawing in wax paper and tape it down. This will allow you to see your bridge drawing and build on top of it without ruining it.

Step 6: Build two sides of your bridge. Once you have two identical sides (left and right side of the road), you can build the bottom.

Step 7: Build the bottom of your bridge.

Step 8: Assemble the left, right and bottom sides of the bridge.

Step 9: Verify your design for the top of the bridge is accurate. If so, build it.

Step 10: Attach top to other three sides.

Step 11: Weigh your bridge: _____grams.

Step 12: Test your bridge. Your bridge held_____grams. (LOAD)

Step 13: Determine your success ratio: $\frac{\text{Weight of Bridge}}{\text{Load}} =$

TYPES OF TRUSSES

Fig. 55. Fink

Fig. 56. Bollman

Fig. 57. Whipple

Fig. 58. Through Howe

Fig. 59. Through Pratt

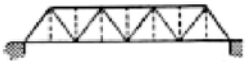


Fig. 60. Through Warren

Fig. 61. Deck Howe

Fig. 62. Deck Pratt

Fig. 63. Deck Warren

Fig. 64

Fig. 65

Fig. 66

Fig. 67

Fig. 68. Baltimore

Fig. 69. Post.

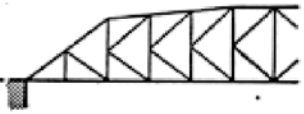
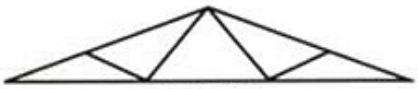


Fig. 70. K Truss

Fig. 71. Bowstring

Fig. 72. Parker

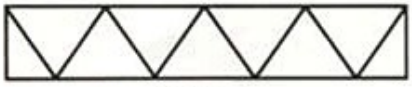
Fig. 73. Pennsylvania



Single Fink

Howe

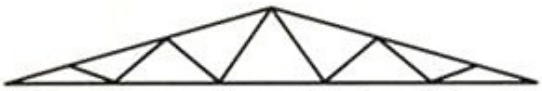
Mono (Various)



Warren

FINK

BOBTAIL



Double Fink

DOUBLE W

FAN

Fan

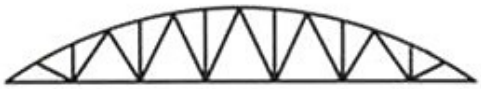
HOWE GIRDER

FLAT TOP

Pratt

RAISED TIE SCISSORS

SCISSORS



Bowstring

PARALLEL CHORD

LOW PROFILE

HOWE

CLERESTORY

RAISED TIE