

**Spaghetti Bridge**

**Instruction Sheet**

**Key Vocabulary**

* **Compression:** The act or process of compressing (pressing together).
* **Deck:** The roadbed or the part of the bridge upon which the load will be placed.
* **Supports:** A vertical column that holds up the bridge.
* **Tension:** The act of process of stretching something tight or taut.
* **Trusses:** The substructure and superstructure) of the bridge which support the deck.

**Directions**

1. ***Develop an overall design concept for the bridge.***The team should collaborate on a design, listening to each member’s best thinking and recommendations. Prior to beginning the build, the team should come to consensus on the design and the team leader should assign specific tasks to each member.
2. ***Build supports for the bridge.*** Bundle several strands of pasta together in the shape of a tube. Apply glue to each strand as you go. Hold each bundle together with a rubber band until the glue dries.
3. ***Build the bridge deck.*** Two possible designs are: 1) a round bundle of unglued spaghetti (lack of glue allows the spaghetti to shift under the weight); or 2) several layers of spaghetti, with each layer consisting of pieces of spaghetti glued side by side to the width of the deck, and the resulting layers glued one atop another to form a thick stack—10 or more layers.
4. ***Design the trusses.*** Build the trusses to scale on a piece of graph paper. This will serve as a template for the building of the bridge.
5. ***Build the trusses.*** Cover the graph paper with a sheet of clear plastic wrap, allowing you to see your template as your build your bridge, without getting glue on the graph paper. Cut the spaghetti to fit the template; lay it out on the template and glue together using white glue or a hot glue gun.
6. ***Build the bridge.*** Glue all the components of the bridge together (supports, deck, and trusses).

**Tips**

* The best truss designs consist of a series of triangles, which are stronger than squares; a triangle that points down is more stable than one that points up.
* Experiment with triangle shapes: M, W, V.
* Bridges must withstand the forces of both compression and tension, which are balanced when the top and bottom of the truss are made up of more material than the center (usually triangular) portion; the top and bottom are subject to the most compression and tension, respectively.