

# The Toothpick Bridge Project

## The Scientific Method

- Make careful observations of nature.
- Form a hypothesis to explain a specific phenomenon or event.
- Perform experiments to replicate and understand the phenomenon.
- Gather evidence through experimentation to support, reject, or modify their hypothesis.
- Repeat these steps until the weight of evidence indicates a sound hypothesis.
- Create a theory based on a sound hypothesis that has not been proven false by experimentation.
- Accept a theory as a law, if it is proven to be a *non-varying* phenomenon.

## The Rules:

Your bridge must be free-standing, and span a gap of 30 cm. It will sit on a piece of plywood that has a hole in the center; this is to attach the string which will hold the weights used to test the bridge. The bridge roadway should be at least 5 cm wide and 30 cm long, and be able to accommodate the testing string attached to the support rod. The roadway need not be filled in ... a row of toothpicks on either side is acceptable. But it must be level. There must be a space under the bridge of at least 5 cm, and not more than 10 cm, that runs the length of the span. Glue (ordinary white glue only) may be applied only to points of contact; toothpicks may not be soaked or coated with glue.

When your bridge is tested, it will 'fail' when the roadway breaks, or flexes more than 2 cm.

Your bridge will receive an 'efficiency' rating, calculated as follows:

**Efficiency = mass supported (in grams) divided by the weight of the bridge (in grams)**

Clearly, the more mass your bridge will hold, the better, ... but the more your bridge weighs, the lower its score will be. Don't use too many toothpicks! **This bridge Can Not have a mass greater than 40grams**

