



# Great West Sound BRIDGE CHALLENGE

Saturday, March 23 • 10am - 3pm @ Kitsap Mall



## The Challenge:

A Hollywood movie producer needs help to re-create a bridge for a new Avengers movie. Your challenge is to research, design and build a truss bridge that can span a distance of 30cm and be a minimum of 6cm wide, and a minimum of 40cm long.

### MIDDLE SCHOOL Design Challenge:

Research, design and build a model bridge that meets the design requirements and has a mid-span accessible testing area that allows for the addition of a Velcro loop. Use ONLY materials listed below.

#### Authorized Materials:

- ◆ Up to 100 popsicle or craft sticks with dimensions  $\leq 11.5\text{cm} \times \leq 1\text{cm} \times \leq 0.25\text{cm}$ . Sticks may be mechanically altered (i.e. broken, cut, split, drilled), but not altered chemically.
- ◆ Water soluble white "Elmer's" glue (Note: yellow wood glue or any glues containing resin adhesives or cement binders are not allowed)
- ◆ 5 gallon bucket with handle (for load testing only – not part of the bridge design)
- ◆ Self-Adhering Velcro loop (to connect the bucket to the bridge for load testing only – not part of the bridge design)

### Design Requirements:

- ◆ Bridge must span a gap of at least 30cm. Bridge length minimum 40cm.
- ◆ Bridge must have a continuous flat "road" surface that is at least 6cm wide. Bridge must have a mid-span accessible load test area to support the bucket.

### Bridge History:

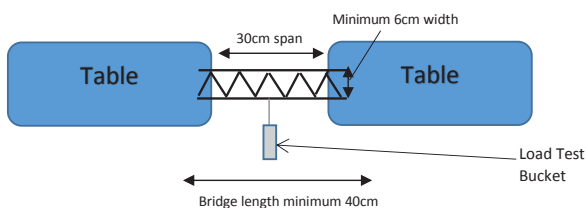
A bridge is a structure that spans a gorge, valley, road, railroad track, body of water, or any other physical obstacle, for the purpose of providing passage over the obstacle.

There are many types of bridges: beam, truss, arch, suspension and cable stayed. A truss bridge is a bridge that uses trusses, or a series of triangles for support.

Engineers need to consider loads when building structures. Loads are weights and forces that a structure must withstand. The dead load of a structure is the weight of the structure itself. The dead load of a bridge, for example, includes beams, cables, and the deck. The live load of a structure is the weight that is added to the structure, including people, cars, and the wind.

### Testing Procedure:

Each bridge will be positioned across a 30 cm gap. Velcro self-adhering strips will be looped around the bridge deck at mid-span to hand a load test bucket where weights will be added, one at a time, until the bridge collapses or you ask to stop. Your bridge's strength rating will be based on the number of pounds it is able to support.



For more info on the Showcase and Bridge Challenge, and for bridge resources, visit [www.westsoundstem.org](http://www.westsoundstem.org).

