STEM SHOWCASE 2019

Great West Sound
BRIDGE CHALLENGE

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

The Challenge:
Your mission, if you choose to accept it, is to employ the engineering design process to construct an amazingly strong, light-weight, one-of-a-kind bridge. In order to do so, you'll need to research, design, test, redesign, retest, and ultimately build a bridge that complies with all of the criteria and constraints outlined below.

HIGH SCHOOL Design Challenge

Authorized Materials:

- Popsicle or craft sticks, unlimited, dimensions: ≤ 11.5 cm x ≤ 1 cm x ≤ 0.25 cm. Sticks may be cut or notched at any angle. Sticks may not be soaked in any material other than water, and may not be painted or coated except with markers, crayons or colored pencils.
- Water soluble white "Elmer's" type glue. (Note: yellow wood glue or any glues containing resin adhesives or cement binders are not allowed.)
- Yarn: type #4. May be Frayed or spliced apart into smaller strands and/or decorated using only markers, crayons or colored pencils. Yarn may not be twisted or braided, or multiple strands of yarn combined to create a larger diameter strand made up of multiple strands, soaked in any material other than water, painted or coated except with markers, crayons or colored pencils.

Design Requirements:

- Bridge must span a 1 meter gap between two support blocks of the following dimensions: 40.5 cm long x 40.5 cm wide x 30 cm high.
- Overall bridge length >1 meter and ≤1.8 meters.
- The center-most 60 cm under the mid-span must remain clear of any support columns.
- Bridge deck must be ≥14 cm wide, with the center-most 30 cm clear to allow for weights to be stacked on it.
- No horizontal loads allowed on the support blocks. Frictional forces are allowed.
- No adhesive material or tethering of any kind can be used to secure your bridge to the support blocks provided.
- Maximum total bridge weight must not exceed 3lbs.

FOR COMPLETE INSTRUCTIONS:
Visit www.westsoundstem.org/2019-bridge-challenge.html

Bridge History:
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:

The **live load limit** will be determined by adding weights to the center-most portion of the Roadway/Bridge Deck until the bridge collapses OR until you ask the judges to stop adding weights. **Design Aesthetic** will also be considered, and a team of judges will score your bridge on a scale of 1-100. Your bridge will also be weighed prior to testing. After your live load is determined, we will then calculate your **Live Load to Weight Ratio.** The larger the ratio the better!

For more info on the Showcase and Bridge Challenge, and for bridge resources, visit www.westsoundstem.org.

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