

Bridge Over Troubled Water Competition

created by Mandy Wells,
with Turner Construction Company,
for the Dallas, TX affiliate

Education Goals Apply structural engineering principles to design a bridge. Learn basic construction planning and cost estimation strategies. Meet deadlines and project requirements. Strengthen teamwork skills.

Description Teams of students compete to design and then test a model bridge that meets certain specifications, including a cost limitation and tight time restrictions. They create their design, budget for labor and materials, develop a construction plan, and purchase materials needed for construction. At a concluding competition, one student from each team must build the model strictly according to the design and within the work schedule estimated during the planning phase.

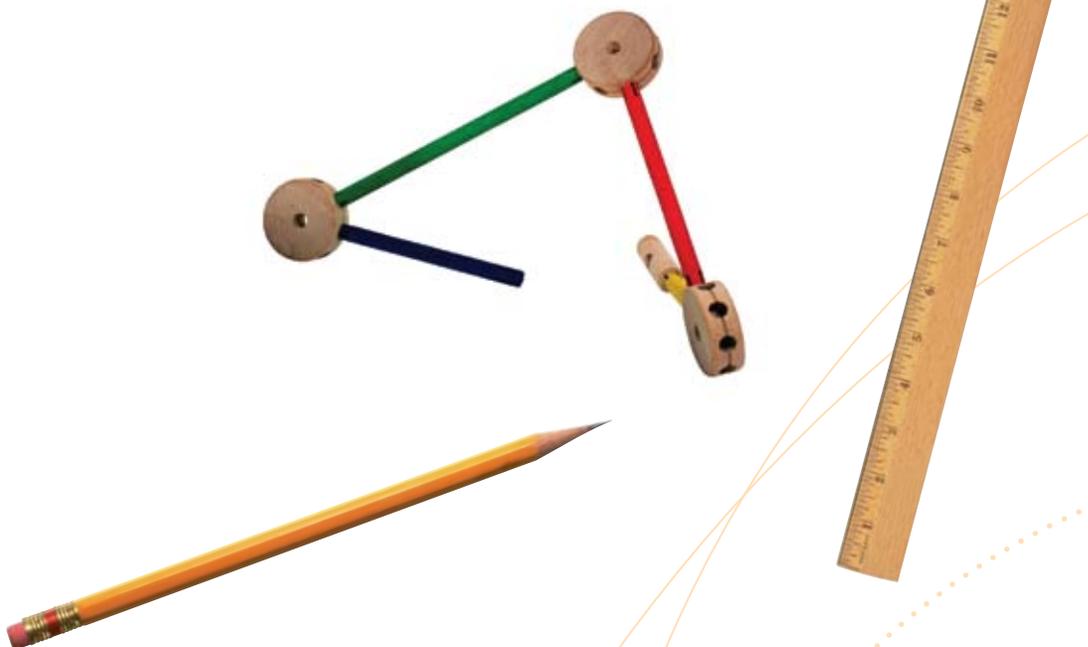
Time 90 minutes (see the *Bridge Over Troubled Water Instructions and Worksheet* that accompanies this activity.)

Materials

- ▶ Tinker Toys for the bridge construction. For four teams, 6-7 large boxes are required. They can be ordered on line. See the *Budget and Cost Sheet* in the *Bridge Over Troubled Water Instructions and Worksheet* for the specific Tinker Toy pieces used.
- ▶ Each team should have rulers, pencils, and 3-4 large sheets of tablet paper on which to draw a design.
- ▶ Each student should be given a copy of the design and construction instructions.



BRIDGES



This activity is divided into two parts – a design and construction planning phase limited to 45 minutes and the construction competition when the bridge model is built by one student. This second part lasts approximately 30 minutes. Details about the organization and implementation of this activity can be found on the final page of the *Instructions and Worksheet*.

This activity/competition most appropriately should be scheduled after students have experienced some sessions focusing on architecture and engineering. Before running the competition, the Dallas affiliate, which created the activity, recommends that mentors meet to review the instructions and procedures and to test out the competition themselves in order to anticipate any questions.

General Procedure

- 1.** Give students a general overview of the competition and briefly explain the design and construction instructions.
- 2.** Divide students into teams of roughly equal size. A Project Manager should be appointed to lead each team and to keep the team on task. (The Dallas affiliate selects someone who is not very outspoken to give this person a new experience.)
- 3.** Each team should be assigned its own work space, preferably in separate rooms so that a team cannot overhear its competitors.
- 4.** Mentors should provide each team with the necessary supplies and materials
- 5.** During the design and construction phase of the activity, mentors should not play a leading role in advising students or helping them with their design. Mentors do need to be the time keepers.
- 6.** After the design and construction phase concludes, the teams reassemble in one room with their completed budget and cost sheets showing their design. Then the competition to build the bridge model starts, with one member of each team competing.
- 7.** After the competition, mentors briefly discuss the pros and cons of each team's submission and the model constructed. The winner can be announced and prizes awarded. ▽