

Build a Bridge

Age Level : 13-15 years

Activity: Engineering a Bridge

Time Required: 50 minutes

Objective

Experience participating as a member of an engineering design team to complete an engineering project within a specified budget and schedule.

Required materials

- Bridge specification, material list, and schedule (provided below)
- Building materials: straws, paper cups, scotch tape, etc.
- Play money for each team
- 0.5L bottle filled with water

Divide the class into engineering teams of 4-8 students each.

Directions to class

You will be given a specification for a bridge, a budget, and a schedule. Your task will be to complete the design and construction of the bridge within the allotted budget and schedule.

Specification

Bridge must span a distance of 30cm between two desks and must be capable of supporting a 0.5L bottle filled with water. The bridge must be constructed exclusively with materials purchased for this project.

Schedule

- Design phase: plan bridge construction and material procurement (10 min)
- Implementation phase: construction (15 min)
- Testing (5 min)

Budget:

Total budget = 20,000
(local currency; appropriate denomination)

Itemized list of available materials:

5 straws = 1000

1 paper cup = 1000

10cm scotch tape = 1000

Hand out specification, budget, and schedule. Briefly review schedule, e.g. all material must be purchased during design phase; no additional material can be purchased after entering implementation phase. Allow about 5 minutes for any questions to clarify objective. Note the specification is left intentionally vague to allow individual interpretation. Once started, write the times when each phase will be completed on the board. Place all of the building materials in a central location for purchase. During the test phase, take the bottle filled with water and test each bridge in turn to see if it supports weight.

Wrap-up

At the completion of this exercise discuss issues and challenges the students encountered and relate these to challenges you face at work. Some examples are the following:

- Do any two bridges look alike? What are some of the differences in designs?
- What makes one design better than another? Strength, Cost, Time, Aesthetics
- Did the final design end up anything like what you planned?
- Was the design specification clear?
- Did everyone feel that they participated equally on their team? Why not? Discuss challenges of working on design teams. How were decisions reached?

Thanks to Steve Delach in Oregon for providing this activity idea.