



## Teacher Resource Guide

This is a quick group activity. It uses simple, inexpensive materials and is an effective tool for problem solving, creative thinking and team building. It is very effective at introducing the impact of constraints and role of prototyping as a visualization tool.

### Objective:

Participants are asked to solve an open-ended problem with time and material constraints. Working in small groups, solutions are developed quickly and yield surprising solutions that may not have been immediately obvious.

### Materials:

- ★ Paper lunch bags
- ★ Challenge cards (can be a slip of paper or an index card)
- ★ Fastener items (ex. wire, rubber bands, paper clips, string, etc.)
- ★ Surface items (ex. Coffee filters, cardboard squares, balloons, paper, aluminum foil, etc.)
- ★ Structure items (ex. Straws, tongue depressors, wood skewers, pipe cleaners, etc.)

### May NOT use:

- ★ Glue
- ★ Tape
- ★ Scissors

### Prep:

1. Fill one lunch bag for each team. Divide your class into groups of 2-4. Each bag should contain 3 or 4 fastener items, 2 or 3 surface items, and 3 or 4 structure items.
  - a. Sample: 2 rubber bands and 2 paper clips, 2 coffee filters, and 2 straws and one pipe cleaner
2. You can give every team the same set of materials, or different materials
3. Write a challenge on each card. Every team in the room can get the same challenge, or every team can get a different challenge -- it's up to you.

- a. The challenge will drive each team's conversations. It's important that the challenge is open-ended to encourage different interpretations and creative thinking. (A list of possible challenges is attached)
  - b. A poorly worded challenge might read something like, "Design a water bottle." Effective wording would be, "Design a way to transport water on the go."
4. Put one challenge in each bag. Don't worry about matching materials with challenges -- remember that you want your teams to use the materials in surprising and creative ways!

#### With The Group:

1. Divide the group into teams of 2, 3, or 4.
2. Each team gets one of the bags that you prepared earlier.
3. Before the teams open the bags, introduce the activity and instructions.
4. Give the group 15-20 minutes to **prototype** a solution using only materials in their bag. Remind the teams that they can't design a solution that already exists!
5. When time is up, the groups present their solutions to the other teams. Ask a group member to read their challenge card aloud and articulate how their solution addresses that challenge.

## POSSIBLE CHALLENGES

Design a way to keep a new baby warm in a place with no electricity.

Design a safe way to cook in a home with no electricity.

Design a way to collect and carry 5 gallons of water 3 miles

Design a way to purify water from a stream

Design a safe light source for a home with no electricity

Design a way to help someone with limited mobility reach objects on a high shelf

Design a way to help someone with limited mobility reach objects on a high shelf

Design a way to help someone get groceries up one flight of stairs

