

Pipe Cleaner Engineering

Total Time: 30 minutes (but can be shortened or lengthened)

Goals of Activity:

- To think about failure moments critically
- To practice getting unstuck methods/ problem solve
- To collaborate/team build
- To make/tinker
- To learn good communication skills
- To observe
- To practice patience

Materials

Pipe cleaners in bunches of 30
Craft sticks in bunches of 30
Rubber bands in groups of 15
Clock (for project manager only)
Getting Unstuck List (see bottom)
Stickers
Tape Measures

Roles:

Project Manager: Facilitator

Architecture Firms: Participants in groups of 4

- Observers- the ones watching the building and putting stickers next to getting unstuck methods that they notice
- Builders- the ones building the tower

Narrative:

- Congratulations! You and your table are an architecture firm that has two roles- builders and observers. Your firm has made it to the final round of an architecture face off! To be crowned winner of the face off, your firm must build the tallest tower in the room. You are competing against the other architecture firms (tables/groups) in the room.
- Okay architects, here are your building conditions:
 - Your tower must be made with only the materials you are given. You cannot use materials around you.
 - Your tower must also be freestanding! It may not receive support from any structures or objects outside of the ground it is standing upon.
 - You must listen carefully to your project manager because they will make you aware of any changes in building conditions as you go!
- Each person will be both an observer and a builder. The builders will build the tower. The observers will watch the progress of the builders and use their stickers to mark any getting unstuck methods they see or hear happening. The project manager will let you

know when your roll will switch. To begin, decide with your firm which two people will be builders first and who will be observers.

The Activity:

The project manager hands out one pipe cleaner bundle to each set of builders and one getting unstuck sheet and sticker sheet to each observer AND builder. Once everyone has a bundle, the project manager begins the challenge and looks at a clock. No time limits should be announced during this activity. Time limits are for the project manager only!

- Please wait until everyone has building materials to start.
- Ready, Set, Go!

The project manager lets the builders work for the first 5 minutes with the building conditions laid out at the beginning of the game. Facilitator does not show anyone time allotments.

At the five minute mark, the project manager adds a building complication/new condition:

Choose One:

- Oh no! You and your partner weren't using proper safety equipment when building your tower and your left hands got crushed and had to be put into a cast! You may now only build with your right hand.
- Oh no! You and your partner do not speak the same language. You can no longer talk to one another.
- Oh no! Someone hit a power line and the electricity went off! You and your partner now have to build in the dark/close your eyes and build.

Builders build for another 5 minutes with the new parameters.

Project Manager calls a shift change! The new builders get 5 minutes to build with the original building conditions. The new observers must watch and record in silence.

- Shift change! Builders become observers now and vice versa! You no longer have any hindrances and return to the original building conditions.

After building for 5 minutes, the project manager adds a building complication/new condition:

Choose One:

- Oh no! There was a supply recall and I have to take away any unused pipe cleaners from your table. You now have a new building material!
Hand out one bundle of craft sticks and one set of rubber bands to each builder pair.
- Oh no! There was an earthquake in the night! You must build atop the structure as it exists now!
Project manager goes around and jostles each table before building can proceed. If the tower falls over, it must remain fallen and be built upon as is.
- Or choose an unused scenario from above

Let new builders continue building with new parameters for 5 minutes.

After 5 minutes, project manager calls for the full firm to become builders in final 5 minutes with no extra building conditions. The original building conditions stand.

- We're pulling a late night! All hands on deck! Everyone from your architecture firm will be builders for the next 5 minutes! Only your original building guidelines are in place!

Give time warnings at 2 minutes, 1 minute, and 30 seconds.

Call time! Hand out one tape measure to each firm and let the firms measure their tower from the base to the highest point.

- Time's out! Hands up! If your tower fell, I'm so sorry! It must remain in its fallen state. Please measure your tower from base to tallest freestanding point and call out your measurement when you've finished.

Winner is announced.

Full Group Debrief with Getting Unstuck Observation Sheets.

Debrief Questions:

- What getting unstuck method was most commonly used? Why?
- Were there any methods that were not used? Why or why not?
- Do you think the same getting unstuck methods that adults use also trend with kids? Why or why not?
- What parameters affected your chosen getting unstuck method?
- Do you feel like you would have used a different method under different conditions?
- How could the project manager orchestrate different conditions BEFORE the activity to help the architecture firms navigate failure moments?
- What could the project manager do DURING the activity to help navigate failure moments?
- What would you do differently if you did this activity again?



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Getting Un-Stuck

**Change your plans
(how you're making it)**

**Change your goal
(what you're making)**

**Change your materials
(what you're using)**

Learn a new skill

Ask a friend for help

Eat a snack

Take a break / walk around