

The Power of Collaboration

Title: Toxic Popcorn Challenge

Skill focus: (gender based difference): Creativity and Innovation.

Description:

The goal of this challenge is for teams of participants to use the engineering design process to solve the Toxic Popcorn Challenge. Participants must develop a product and process to safely transfer the toxic popcorn from the unsafe container to the safe container, using only the materials provided to them and never crossing the contaminated area.

Supporting Material per Table:

1. 15 Toxic Popcorn Challenge kits. The content of each kit is:
 - a. 2 containers, coffee cans work well. To be used for the testing phase.
 - b. 2 containers, coffee cans work well. These should be slightly different in size than the containers used for the actual toxic zone in the decontamination phase.
 - c. 1 can of un-popped popcorn kernels (half container for testing phase and other half for decontamination area)
 - d. 6-8 pieces of 2 meter rope (clothesline rope works)
 - e. 1 bicycle tire tube or large rubber band, 0.5 meters diameter
 - f. 1 piece of large flip chart paper
 - g. 1 marker
2. Masking tape.
3. Red and green stickers (the ones used for labels will do): these are used in the seating arrangement.
4. Instruction slides, along with takeaway messages about gender-difference in innovation and creativity.
5. Timer.
6. Voting buttons.
7. Scoring sheet to calculate the winner.

Note: the challenge is designed for 15 groups, we recommend you prepare 2 additional packages (17 in total) in case you have extra attendees instead of adding people to the tables as that skews the final results.

Group set up:

'Toxic' zones:

With the masking tape set up the 'toxic' zones. Make 15 circles, 0.5 meters in diameter on the ground on both sides of the tables set up.

'Testing' zones:

60 attendees: 15 tables: 4 per table.

Table No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Men	0	3	2	4	1	0	3	2	4	1	0	3	2	4	1
Women	4	1	2	0	3	4	1	2	0	3	4	1	2	0	3

Instructions:

1. Once people start arriving instruct the women to sit at seats marked with a green sticker, and men to sit at seats marked with a red sticker.
2. If there are tables with gaps and participants that are missing, ask people to move around and complete the tables in order for each team to have 4 participants. Once everyone is seated, the presenter can start.
3. Each team is allocated one bag of materials. The volunteer in charge of the team keeps the bag until the presenter is done explaining the rules and signals them to distribute the material.
4. The presenter will start by discuss the following before allocating the material.
 - a. The Scenario: A can of highly toxic popcorn has contaminated a circle of approximately 0.5 meters in diameter "the City" (you can point to the circles of masking tape on the floor to show the 'toxic zone'). The toxic area extends to the ceiling. If the toxic popcorn is not transferred to a safe container for decontamination, then it will contaminate and destroy the entire city. The popcorn is estimated to have a safe life of exactly 30 minutes before it explodes. It's up to us to save the city!
 - b. Design Challenge: Inside the circle/ 'toxic zone' you will find two containers. One (unsafe container) is half full of the toxic popcorn. The other (safe) container is available for decontamination. Find a way to safely transfer the toxic popcorn from the unsafe container to the safe container, using only the materials provided to you. You have 25 minutes to design and test your prototype, and then 5 minutes to execute your decontamination mission. If you create more than one prototype you can only chose one for your decontamination mission.

These are the Rules:

During the testing phase:

You are free to do what you like, you are not being judged. We advise you to follow the rules applicable in the 'toxic zone' in order to simulate actual conditions. You will not be penalized if you do not.

During the decontamination mission phase:

You will have 5 minutes to move your design and complete your mission. You will be judged in this part of the mission.

- No one may cross the plane of the circle with any part of their body.
 - The popcorn and containers cannot cross the plane of the circle. Only the ropes & tire tube may cross.
 - No more than 10 kernels are allowed to spill, or the popcorn will explode.
 - You may use only the materials provided.
 - The popcorn must be transferred within 5 minutes or there will be a disaster.
 - Clarify that only one attempt is permitted during the decontamination phase.
- c. Materials: review materials in slides provided
- d. Scoring: review points in slides provided
5. Allow 5 minutes for clarifications and questions from the audience before you start the challenge.
 6. Ask the volunteers to provide each team with their material.
 7. Start the timer and ask the teams to start.
 8. Use a stopwatch to ensure you keep on time and give Participants regular "time checks" so they stay on task. If they are struggling ask questions that will lead them to a solution quicker (proposed solutions are attached).
 9. Provide each team with one large flip chart paper to draw their design and write out (as well as sketch) their final process.
 10. After 25 minutes of designing, building and revising, all participants must stop.
 11. Presenter announces time is over and start the clock for phase two – 5 minutes
 12. Participants move their design to the contaminated zone to proceed with their decontamination mission. They have 5 minutes.
 13. Volunteers have a huge role here. Each volunteer takes their team to their 'toxic zone'
 14. During the 5 minutes, volunteer must judge based on:
 - a. Did they use only the material provided?
 - b. How many additional materials did they use?
 - c. During the decontamination, did they cross the toxic area?
 - d. If they crossed the zone, how many times?
 - e. Did any corn kernels fall out of the container while moving? If so, how many?

15. When the 5 minutes are over, volunteers must judge based on:
 - a. Did they pass the test (no more than 10 corn kernels fell out of the container)
16. A facilitator is overseeing all volunteers. The facilitator will judge the most creative / innovative design among all teams.
17. The facilitator enters the measurements into the Excel sheet while the presenter asks the participants to answer the keypad questions and then goes over the takeaways. (Toxic Popcorn Challenge takeaways).
18. Keypad questions here are asked with the assumption that a minority of one gender reduced the confidence in the result¹.
19. Go over results of the keypads highlighting any differences in gender tables noticed.
20. The Excel sheet will calculate the results and display on screen.
21. Congratulate the winning team.
22. Thank the volunteers.

Time break down:

Action	Time (minutes)
Explanation Stage	10
Questions	5
Designing, building and testing	25
Completing decontamination mission – this includes moving the prototype to the toxic zone	5
Takeaways & scoring – includes keypads	10
Winner	5
Total	60

How we decide who wins points:

Action	Points
Did they use only the material provided	-5 points for every extra item
During the mission, did they, or any part of their body, cross the toxic area? If so how many times did it happen?	-5 for every time it happens.
Was the mission a success? (no corn kernels fell out of the container)	+50 points if yes, 0 if no.
If kernels fell during the decontamination mission, how many?	-5 for each one, anything over 10 then it will be - 50.
Most creative design (Assigned to one team member to choose)	+10 points
Finishing before 25 minutes in the testing phase	+10 points

¹ *Report titled “Innovative Potential: Men and Women in Teams” The Lehman Brothers Centre for Women in Business

Volunteers roles:

We recommended for this exercise each volunteer be responsible for one table to manage the activity. So 1:1 team volunteer ration. The main team will have to do oversee the volunteers, and present the activity.

No	Action	Volunteer Role	Note
1	After facilitator explains instructions	Ensure everyone at the table understand what they need to (design, construct and test).	
2	Once the facilitator gives the volunteers the signal that they are done taking questions.	Gives the team one box of material mentioned above	Do not give them the equipment before the facilitator gives the signal, in the past they always start and don't listen.
3	During the testing phase	Give time checks every 5 mins to your team	
4	Once the timer goes for 25 minutes	Ask your team to move their design to the toxic zone to start the decontamination mission)	
5	During the decontamination phase	Make sure your team follows the rules. Fill out the scoring sheet and take note of any rules not followed.	Rules: 1. No one may cross the plane of the circle with any part of the body. 2. The popcorn and containers cannot cross the plane of the circle. Only the ropes & tire tube may cross. 3. No spills are allowed, or the popcorn will explode
6	Once the timer has ended	Complete the scoring sheet. Make sure to get the most creative score from the assigned judge) Once this is done, give the sheet to the facilitator to enter into the excel sheet.	
7	Winning team announced	Get up the front and be in the picture with them	

Thank you for your help 😊

Scoring sheet:

Team Number: _____

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Used only material provided? (yes/No)															
If no, how many extra?															
Did they cross the toxic area? (yes/No)															
If yes, How many times?															
Was the mission a success?															
Did they drop any kernels?															
If yes how many?															
Most creative design (judged by other member)															
Finishing before 25 minutes in the testing phase															