

3rd Grade Tower Building (45 Minutes - Coach Scheduled Event)

Description: Teams will build a strong, stable tower from index cards and masking tape. The team that builds the highest tower with the fewest cards and the smallest area base while holding a mass no less than 100 grams and no more than 1000 grams will be the winner. This event has a written test.



Participants per team: 2

Spirit of the competition:

- It is a rules violation if coaches, parents, mentors, or spectators enter the competition area or communicate with the team members at any time during the competition. Violation of this rule will place the team below all other teams.

Teams need to bring:

Pencil, pen or marker. Optionally a ruler/straightedge and protractor. No scissors.

Team Needs to Bring:

Safety glasses labeled ANSI Z87.1+ (impact rated)

- All competitors must always wear their eye protection during all phases of the competition.
- If a team does not have the required eye protection, they will be given the opportunity to obtain it, time allowing, but will not receive extra time.
- If a team is unable to obtain eye protection, the team will not compete and will receive a no-show score.



Materials Provided at Event:

Index Cards (amount decided on competition day), 1 meter or 2.54 cm masking tape, a 5cm x 5cm square of plywood to place on top of the tower for testing, and an object with a mass no less than 100 grams and no more than 1000 grams.

The Competition: ***Construction and Written testing will occur at the same time.***

Part 1 – Written Test and Construction Phase: Timed 30 Minutes

- The team members will take a short test on the differences in building and practical use of guyed or cable-supported, free-standing or self-standing, and monopole types of towers.
- Teams will construct a tower that rises the greatest possible distance with the smallest area base while supporting the provided object placed at the highest point by the team.
- The amount, length and width of the index cards for this competition will remain secret until the day of the competition.
- The Event Supervisor will announce on the day of the competition the object and the mass of the object each tower is to hold.
- The tower must support the object for ten seconds.
- Teams may cut the tape into any shape or size.
- Index cards may not be cut or torn but may be bent by the teams.
- The Event Supervisor will record the amount of index cards left for each team.
- Any team using any tools or materials other than those listed above will be ranked below all other teams.

Part 2 – Tower Testing Phase

- Teams will place the tower on a flat surface.
- All support parts of the tower must rest on top of the flat surface.
- No sticky part of the tape may touch the top or sides of the flat surface
- The Event Supervisor will measure the height and area of the base of the tower to the nearest millimeter and millimeter²(1mm) before testing begins.
- To begin testing, the teams will place the 5cm x 5cm wood block on top of their structure. (The supervisor will not add the height of the block to the height of the tower measurement).
- Timing begins when teams place the mass on top of the wood block and remove their hand.
- Testing will end when the tower fails to hold the object or the end of the 10 seconds.
- The Event Supervisor or appointed judge will be the official timekeeper.

Event Supervisor Records:

- Height of tower to the nearest millimeter
- Area of the base of tower to the nearest millimeter²
- Time to structural failure to the nearest 1/100th of a second
- Amount of unused index cards by each team
- Team test score.

Scoring:

Teams will receive two weighted rankings. These rankings will be added to find the final placements. The team with the lowest sum will place first.

- 25% of team score: Teams receive a ranking based on their written test score.
- 75% of team score: Teams receive a ranking based on their tower. Teams with the highest tower and smallest area base will rank ahead of all others measured to the nearest millimeter and millimeter² (1mm) by the Event Supervisor or appointed judge.

Tiebreakers:

- Least amount of index cards.
- Time for structural failure.

Scoring Example:

Equation: (written test ranking x 0.25) + (building ranking x 0.75) = final ranking

- Team A ranks 3rd on the written test. This scores 0.75 ranking points. The team also scores 5th on their tower build. This scores 3.75 ranking points. The team's final ranking score is 4.5.
- Team B ranks 2nd on the written test. This scores 0.5 ranking points. The team also scores 7th on their tower build. This scores 5.25 ranking points. The team's final ranking score is 5.75.
- Team A is placed first in the rankings.

Possible Resources

Division A will not release previous tests, or the exact resources used by the Event Supervisor or test writer for any events. The listed resources are meant as a starting point. It is up to the competitor to research further.

- [Tall Tower Challenge - TryEngineering.org Powered by IEEE](http://TryEngineering.org)