

Bridge Building (45 Minutes - Coach Scheduled Event)

Description: Each team will build a strong, stable, and free-standing bridge from 25 paper drinking straws and 1 meter of tape. The team that builds the tallest bridge and holds an object for 10 seconds with the fewest straws will be the winner. This event has a written test component.



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.

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.



Team Must Bring:

- Pencil, pen or marker, a ruler or straight edge, and one pair of scissors for each team member.

Materials Provided at Event:

25 paper drinking straws, 1 meter of 2.54 cm tape, an object with a mass no less than 100 grams and no more than 500 grams, 2-5 cm x 9.5 cm x 30.5 cm support structures, and a 5cm by 5cm loading block.

The Competition:

Construction Phase and Written Test: Timed 25 Minutes

- Teams will construct a bridge that is able to support an object placed on the loading block by the team and in the center of their bridge deck at a right angle to the length of the bridge.
- The bridge must have a width of at least 6 cm, outside edge to outside edge, with any length using the materials provided.
- The length and diameter of straws and the type of tape 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 bridge will have to hold. The mass of the object will be no less than 100 grams and no more than 500 grams.
- The bridge must support the object for one minute, with partial points given for any time above 10 seconds.
- Teams may cut both the straws and the tape into any shape or size. Teams may crimp and slide the straws inside each other.
- The Event Supervisor will record the number of complete straws left for each team.
- Any team using any tools or materials other than those listed above will receive a tier violation and be ranked below all other teams.

Bridge Testing Phase:

- The students will take a short test on bridge types.
- Teams will place their bridge on a flat and level surface such as a tabletop or floor.
- The Event Supervisor will measure and record the height to the nearest millimeter (1mm).
- The team will then place the 5cm by 5cm loading block in the center of the bridge deck.
- The Event Supervisor will start the team's time when the weighted object is placed on the 5cm-by-5cm block.
- During their minute the team may not touch or move their bridge without incurring a tier violation.
- No sticky part of the tape may touch the top or sides of the testing surface.
- Testing will end when the bridge fails to hold the weight, any part of the bridge sags and touches the tabletop, or the end of ten seconds.
- The Event Supervisor or appointed judge will be the official timekeeper.

Event Supervisor Records:

- Height of the bridge at the highest center point.
- Time to structural failure.
- Amount of unused whole straws by each team.

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 the team score is a ranking based on the team's written test score.
- 75% of the team score is a ranking based on the team's height of their bridge measured at the center point.
- Teams in Tier 1 will be ranked from highest to lowest, followed by any teams with Tier 2 building penalties.

Tiebreaker:

- The least number of whole straws used.
- Time to 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.

- [Bridge - Wiki - Scioly.org](#)
- [What Makes Bridges So Strong? | Engineering for Kids | STEAM | SciShow Kids](#)
- [Straw Bridges - The Stem Laboratory](#)