



## Cardboard Boat Challenge

### *Teachers Information*

The Cardboard Boat Race Challenge is a team event which is made up of 4 students from your school.

#### **CHALLENGE:**

The challenge of the boat race is to design, construct and race a boat made out of across a swimming pool. Participating schools will be provided with the required materials on the day of the event.

The challenge is open ended, problem solving in nature, paralleling the thrust of broad-based curriculum. It involves:

- |                                  |   |
|----------------------------------|---|
| ❖ Design research & presentation | Principles of structure, strength, rigidity |
| ❖ Water Permeability             | Propulsion                                  |
| ❖ Friction and direction control | Buoyancy and displacement                   |
| ❖ Adhesives and bonding          | Teamwork and FUN                            |

#### **OBJECTIVES:**

- To design and construct a boat with only the supplied materials in 1 ½ hours or less.
- To learn to work as a team

#### **ELIGIBILITY:**

- Teams must be made up of four students from the school.
- Judging will be based on: *design construction, speed across the pool and weight carried.*
- Judging will occur throughout the challenge. Judges will be independent and drawn from the community.
- If you school wants, you can bring a school or club banner to cheer on your team! **(Mascots, Cheerleaders, and enthusiastic friends/family welcome!!)**

**Requirements:**

A design sketch of each team's boat must be submitted to the judges during the construction on the day of the event. Each team should keep a copy of the sketch to refer to when building their boat, points will be awarded for sketch innovation and how closely their construction follows their sketch.

Students will be judged on:

- Sketch innovation and design
- Construction follows sketch
- Construction quality
- Teamwork and Organization
- Safety and cleanliness of area
- Visual Appeal

Tools & Materials:

Supplied

1. one roll of packing tape
2. two 4 x 8 feet sheets of ¼ inch cardboard
3. 25 feet of string (8 meters)
4. one paper clip
5. one small roll of duct tape
6. two exacto knives
7. one laminated sheet with specified team number
8. two pencils

**Supplied by Team:**

1. a maximum of 2 straight edges/rulers of any length or size
2. a maximum of 2 tape measures

*(Note: No other tools or equipment may be used during the construction of the boat).*

## **RULES & REGULATIONS:**

1. All Students must be weighed after registering at the event.
2. A design sketch of each team's boat must be submitted to the judges during construction on the day of the event. Each team should keep a copy of the sketch to refer to when building their boat, as points will be awarded for sketch innovation and how closely their construction follows their sketch. Teams are allowed to bring a prototype of the boat that they will be building.
3. Each team must secure the laminated number on their boat in a visible location
4. No tools may be used other than those listed under Tools & Materials. Stencils/templates of any kind will not be permitted in the construction of the boats.
5. No external help during the competition (i.e. teachers, parents, advisors, etc.)
6. All cutting must be done on the provided sheets of wood, judges will deduct constructions points if teams make cuts without the use of the wood panels.
7. In the speed event all teams must start on the pool deck, with their boats out of the water. Once the whistle is blown and the time begins, teams will then place their boats into the water.
8. Team members riding and propelling the boat must climb into/onto the boats. **NO RUNNING STARTS ARE ALLOWED.**
9. During the Speed Event team members in/on the boat must be kneeling or sitting when propelling the boat toward the finish line. **LYING DOWN IN THE BOAT IS NOT ALLOWED.**
10. The Speed Event is completed by having one part of the boat touching or crossing the finish line. A minimum of one competitor must ride in/on the boat across the entire length of the pool.
11. Any devices used to propel the boat during the Speed Event (other than arms/hands) must be constructed from the provided material. Feet may not be used as a propelling device.
12. In the Speed Event teams will race in heats against the clock. Additional points will be awarded to the 7 best overall times.

13. *In the Weight Event a maximum of four members are allowed in the boats, no additional members from other teams are allowed in the boat until the 2 minute time trial is completed. Points and rank for the Weight Event will be based on the combined weight of the team members during the initial 2 minute time trial. After all teams have completed the 2 minute time trial, teams that still have functional boats will be given the opportunity to complete a second weight trial putting as much weight as possible into their boat (there is no limit on the number of bodies a team uses), no additional points will be awarded for this second time trial.*
14. Any team wishing to compete in the Weight Event must have successfully completed the Speed Event.
15. Judges discretion will be used to determine if the boat is floating and holding the full weight will receive bonus points.
16. In the Weight Event the 7 teams which remain afloat for 2 minutes with the greatest weight will receive bonus points.

***HOW TO GET INVOLVED:***

**PRE-RACE PROCEDURE:**

1. Select one or two boat building teams.
2. Register students.
3. Students should research the design and construction of boats and build a “Test Boat” at the school.

***ON THE DAY***

1. Bring an extra set of warm, dry clothing to change into for your trip home.

***TENTATIVE SCHEDULE OF THE DAY:***

<b>TIME</b>	<b>DESCRIPTION</b>
<b>9:30 AM - 9:50 AM</b>	Arrival and registration of students and judges
<b>9:50 AM – 10:00 AM</b>	Announcement / Instructions
<b>10:00 AM – 11:30 AM</b>	Boat Construction Judging on boat construction
<b>11:30 AM – 12:15 PM</b>	Lunch for students. Judges finish judging boat construction & go for lunch.
<b>12:15 PM – 1:00 PM</b>	Tour of the shop areas.
<b>1:05 PM – 1:15 PM</b>	Teams move boats from shops to swimming pool Judges proceed to swimming pool
<b>1:15 PM – 2:00 PM</b>	Races and Weight Challenge
<b>2:00 PM – 2:30 PM</b>	Judging and Evaluation
<b>2:30 PM – 2:45 PM</b>	Awards and Presentation

***POST-RACE:***

1. Evaluate the design and structure of your boat.
2. Make recommendations for improving your boat.
3. Begin design package prior to next year's event.

**EXTRA HINTS OR TIPS:**

- At least one person must ride the boat across the pool.
- Look over the judging sheet to determine your strategy for the race as the criteria used for marking is listed on the sheet.
- Team members will be allowed to help stabilize the boat at the start of the race in the pool to allow the rider to enter the boat. When stabilizing the boat in the water, team members must not be more than one arm's length away from the edge of the pool.

**Debriefing:**

**Teachers should have a debriefing with your students one or two days after the event.**

**Things to Discuss:**

- **What did you like about the boat challenge?**
- **What would you change?**
- **Evaluate the success of your design**
- **What changes would you like to make**
- **Evaluate the winning design**