



Cardboard Boat Competition

Level: Middle and High School (6th – 12th grades)

Type of Contest: Team

Composition of Teams: 2-5 students per team; 2 people must be on boat

Overview: Students will work as an engineering design team with the goal of building a cardboard boat that travels the length of a high school pool in the least amount of time.

Materials:

Only the following materials are permissible:

- Untreated Cardboard (Provided by Students)
- Water-based polyurethane (Provided by MESA)
- Any kind of tape (Provided by MESA)
- NOTE: Tape can only be used to cover joint areas in any direction and amount; tape cannot be used to fully cover any surface area on the boat (i.e., side, bottom, inside, etc.)

Rules:

1. Boats Size: Maximum boat size is 6 feet wide, 8 feet long, and a minimum of 1 foot high. Rafts will automatically be disqualified.
2. Boats submitted the day of competition, must be competition ready (fully dry and constructed).
3. Teams may use as many coats of polyurethane as deemed appropriate. The MESA center will provide a provision based upon the number of teams from one school participating in this competition.
4. Boats that appear to be wet due to recent polyurethane coatings or flimsy with loose parts will be disqualified. **NOTE: It takes water-based polyurethane about 3 days to dry, so apply the last coat of polyurethane at least 3 days before the event.**
5. Boats may not be painted or marked with anything that can pollute the pool. Painted or marked boats will lead to disqualification. Cardboard that is already printed on, but not treated (ex. Wax-like coating) is acceptable.
6. The students who constructed the cardboard boat must be the same students who will be participating in the race.

Judging:

1. The competition will be judged by the boat's performance in the pool.
2. Each boat will have one opportunity to race.
3. Each team will have 1 minute to stabilize their boat in the water.
4. Once the team members of all teams are safely secured in the boats or the stabilization time period has elapsed, the race will begin on the following command: "Ready, Set, Go!" or something similar.
5. The back of the competing boats will be lined up against the pool wall to ensure a fair start. NOTE: the starting location will be the same in all heats.
6. Timing will cease once the front part of each boat crosses the finish line.
7. The finish line will be marked by a cone along the side of the pool, at least 10 feet from the pool wall opposite the starting location.
8. The distance between the starting location, where all lead bodies in the boat are lined up, and the finish line will be the same for all teams.
9. No points will be awarded to boats that capsize, sink, or fail to travel the entire length of the pool.
10. **Spirit Award:** One award will be given to the team who has the most spirit! This means, having great sportsmanship and creativity with their outfits/costumes. The Spirit Award is separate from the actual judging of the boat.

Awards: Medals will be given for 1st, 2nd, and 3rd place teams, as well as a one Spirit Award.

Lab Report

Aside from constructing a boat that will travel the length of a pool, students are expected to conceptualize their building process.

Lab Report must be from 1- 2 pages in length, Times New Roman font, 12 point font and double spaced with 1 inch margins.

Lab Scoring: For **EVERY FIVE** points received on the lab report .5 seconds will be taken off the final heat time.

Ex. Heat Time 28 seconds, lab report score 30 . $28-3= 25$

Your lab report should include the following criteria:

1. **Identify the Purpose:** What is the purpose of this competition? What is the overall goal?
2. **Design Process:**
 - a. Brainstorming Process:
 - i. How did your team come up with the design?
 - ii. What materials did you optimize for? Ex: type of tape, cardboard, etc
 - b. What STEM Concepts were considered in the building of this project?
 - i. Ex: How did the weight of the passengers factor into your design?
 - c. Please explain the roles each team member have. How many hours were invested in the process of this project?
3. **Challenges**
 - a. What were some challenges that you encountered during the building process and how did you overcome them?
4. **Hypothesis:** Although you may not be able to test your final project, do you think believe your boat will be successful?
5. **Conclusion:** What did you learn from this project?

Lab Report Scoring Criteria

Team Members: _____, _____,
 _____, _____, _____

School: _____

Criteria	5	4	3	2	1	0
Purpose: Team clearly identified the purpose of the competition and overall goal.						
Design Process: Team covered all areas of the design process. Team clearly explained the brainstorming process of project, included STEM concepts, and roles that each member had.						
Challenges: Team stated challenges they faced while building their boat and provided clarity on the steps they took to resolve each challenge.						
Hypothesis: Based on their design, team came to a final conclusion on the success of their boat.						
Conclusion: Team shared their final thoughts on project and what they learned in the process.						
Neatness: Lab report does not exceed the 2 page maximum, has the correct font, and format.						
Subtotal						/30